

# **TROUBLESHOOTING**

**EXPERT 2000™**



# TROUBLESHOOTING

## EXPERT 2000™

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## 3.0 TROUBLESHOOTING

### 3.1 INTRODUCTION

This section contains information that will help Labrie end users to narrow down and solve problems that might occur on the standard Labrie™ Expert 2000™ unit. Procedures throughout this section require from the people who will perform troubleshooting tasks, to have basic knowledge in electrical, hydraulic and pneumatic systems. The employer shall ensure that the maintenance personnel are trained prior to beginning troubleshooting. Before proceeding to some maintenance on a vehicle, make sure that all safety procedures are applied. The lockout/tagout procedure outline in the Operators Manual is mandatory to ensure the safety of those who works on and around the vehicle.

Refer to [section 3.3](#) “Troubleshooting guide in order to resolve commonly seen problems or contact LabriePlus to talk to one of our product specialists.



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### 3.2 HAND TOOL REQUIREMENTS

To pinpoint the cause of a problem on a vehicle, some hand tools are necessary to perform tests on components (pneumatic, hydraulic or electrical). Here is a list and pictures of the minimum required tools to perform troubleshooting procedures throughout this manual. These are only suggestions; product brand names may differ.

#### REQUIRED HAND TOOLS

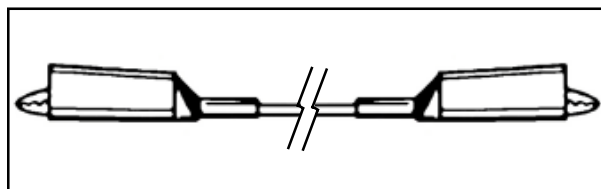
**Digital Multimeter or VOM:**  
(Volt-Ohm-Milliammeter)

**NOTE: THE AMMETER MUST SUPPORT AT LEAST 10 AMPS.**



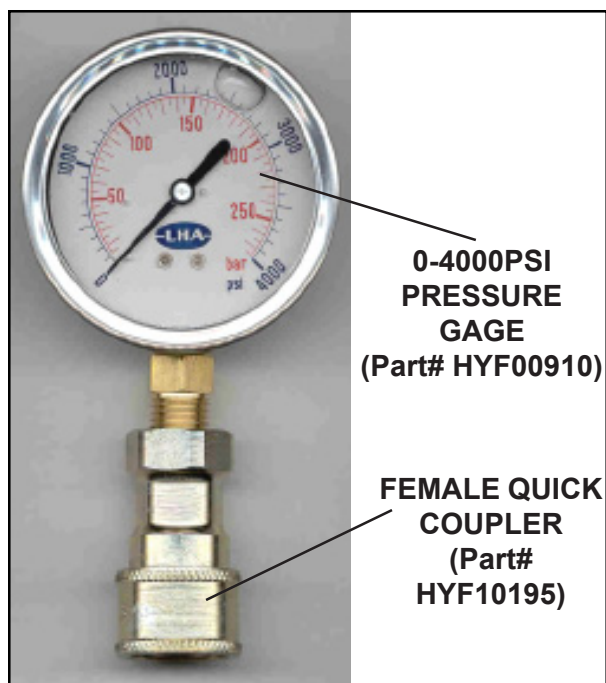
**FIGURE #3.1**

**Jumper wire with alligator clips**



**FIGURE #3.2**

**Two oil gages (0-4000psi)**



**FIGURE #3.3**

**Ball-end Hex Key (Metric & SAE)**



**FIGURE #3.4**

### 3.3 TROUBLESHOOTING GUIDE

This troubleshooting guide will help identify the most commonly seen problems on the Labrie™ Expert 2000™ Side Loader. This table will also provide the possible cause of the problem and give solutions to resolve the problem. For further information regarding customized options that might not be found in this troubleshooting guide, contact LabriePlus.

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>Insufficient packing ratio.</li> </ul>	1. Low oil pressure;	1. Perform hydraulic pressure adjustment procedure. Refer to <a href="#">section 1.15</a> "Hydraulic Vane Pump Systems" or <a href="#">section 1.16</a> "Gear Pump Systems" for pressure adjustment procedure.
	2. The packer hydraulic cylinders are internally bypassing;	2. Refer to <a href="#">section 3.19</a> "Internal leak detection".
	3. Defective pump.	3. Replace the pump.

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The hydraulic oil is over heating (Temperature higher than 180°F (77°C)).</li> </ul>	1. Oil level in hydraulic tank is too low;	1. Add oil to the required level. Refer to <a href="#">section 1.14.5</a> "Hydraulic tank inspection procedure".
	2. Hydraulic pressure is too low or too high;	2. Perform the hydraulic pressure adjustment procedure. Refer to <a href="#">section 1.15</a> "Hydraulic Vane Pump Systems" or <a href="#">section 1.16</a> "Gear Pump Systems" for pressure adjustment procedure.
	3. Not the proper grade of oil. (i.e.: too thin in hot temperatures or too thick in cold temperatures);	3. See <a href="#">section 2.1</a> "Recommended Lubricants" for proper type oil to use. Refer also to <a href="#">section 1.14.6</a> "Hydraulic oil replacement procedure".
	4. Contaminated oil;	4. Clean the strainer inside the tank and change the return filter element. Fill with clean oil. Refer to <a href="#">section 1.14.6, 1.14.7 &amp; 1.14.8</a> .
	5. Restriction in the system;	5. Check all hydraulic components that may have debris, causing restriction in the system. Have the pump inspected by a specialist.



### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>Oil is foaming</li> </ul>	1. Low oil level;	1. Add oil to the required level. Refer to <a href="#">section 1.14.5</a> "Hydraulic tank inspection procedure".
	2. Air getting into the system;	2. Tighten the connections of all hoses and pipes between the pump and the hydraulic tank.
	3. Not the proper grade of oil.	3. Empty oil and refill with anti-foaming oil. Refer to <a href="#">section 2.1.5</a> "Lubrication" for the proper type of oil to use. Refer also to <a href="#">section 1.14.6</a> "Hydraulic oil replacement procedure".

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>Cavitation, excessive noise or vibration of the pump.</li> </ul>	1. Ball valve on the hydraulic tank is not fully open;	1. Fully open the ball valve on the hydraulic tank. Refer to <a href="#">section 1.9</a> "Prior to start up".
	2. Low oil level;	2. Add oil to the required level. Refer to <a href="#">section 1.14.5</a> .
	3. Oil too thick;	3. See <a href="#">section 2.1</a> "Recommended Lubricants" for proper type oil to use. Refer also to <a href="#">section 1.14.6</a> "Hydraulic oil replacement procedure".
	4. Air in the system;	4. Refer to <a href="#">section 3.5</a> "Pump Cavitation".
	5. Particle contamination or dirty strainer;	5. Clean the strainer inside the tank and change the return filter. Fill with clean oil. Refer to <a href="#">section 1.14.6, 1.14.7 &amp; 1.14.8</a> . Take an oil sample for further analysis. Refer to <a href="#">section 2.1.5</a> "Hydraulic oil test"
	6. Suction hose blocked;	6. Unblock or replace the hose.
	7. Flow control is dirty or faulty; May also be noisy. (on system with gear pump)	7. Remove and clean the flow control if hot. If afterwards it gets hot, replace it. Refer to <a href="#">section 1.15</a> "Hydraulic Vane Pump Systems" or <a href="#">section 1.16</a> "Gear Pump Systems" for pressure adjustment procedure.

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The pump (PTO) does not engage.</li> </ul>	1. Air pressure;	1. Make sure the air pressure is above 90 PSI.
	2. Red emergency stop button(s);	2. Ensure that the red button(s) on packer control station(s) is(are) pulled out.
	3. Panic bar (if installed);	3. Make sure that the button behind the panic bar(s) is (are) pulled out.
	4. Engine speed is higher than 900 RPM;	4. Reduce engine speed below 900 RPM. If the RPM cannot be reduced under 900RPM, contact your local chassis dealer.
	5. Electrical;	5. Check fuses inside the console and the main fuses located at the battery. Refer to <a href="#">section 3.4</a> "Pump troubleshooting".
	6. Faulty PTO solenoid valve.	6. Replace the PTO air solenoid valve on the pump or into console (dry valve only).

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>No hydraulic pressure.</li> </ul>	1. Pump is not engaged;	1. Turn the PTO switch "ON".
	2. Pressure adjustment;	2. Check the pressure adjustment. Refer to <a href="#">section 1.15</a> "Hydraulic Vane Pump Systems" or <a href="#">section 1.16</a> "Gear Pump Systems" for pressure adjustment procedure.
	3. Hydraulic line;	3. Perform a circuit analysis with the main hydraulic schematics <a href="#">section 3.21</a> or <a href="#">section 3.22</a> .
	4. Hydraulic spool inside the valve.	4. Make sure that no spool inside the directional valve is stuck in a position that could send the hydraulic flow to the tank.

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The pump is leaking oil.</li> </ul>	1. Loose connections;	1. Tighten all connections at the pump.
	2. The pump shaft seal is damaged.	2. Have the pump repaired by an authorized service center.

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The packer is moving vertical or sideways.</li> </ul>	<ol style="list-style-type: none"> <li>The packer wear pads have too much wear;</li> <li>Sliding shoes have too much wear.</li> </ol>	<ol style="list-style-type: none"> <li>Inspect or replace the wear pad as indicated in <a href="#">section 1.12.5</a>.</li> <li>Inspect or replace the sliding shoes as indicated in <a href="#">section 1.12.3</a> <a href="#">1.12.4</a>.</li> </ol>

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The tailgate is unlocking or lowering by itself.</li> </ul>	<ol style="list-style-type: none"> <li>The velocity fuse is dirty or defective;</li> <li>Inverted hydraulic hoses on the main hydraulic valve.</li> </ol>	<ol style="list-style-type: none"> <li>Clean or replace the velocity fuse. Refer to <a href="#">section 3.20</a> "Tailgate locking mechanism troubleshooting".</li> <li>Test the "power bleed" on the tailgate section of the valve. Refer to <a href="#">section 3.20</a> "Tailgate locking mechanism troubleshooting".</li> </ol>

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The service brake light is still "ON" after releasing the service brake.</li> </ul>	<ol style="list-style-type: none"> <li>Pressure switch behind the service brake toggle switch.</li> </ol>	<ol style="list-style-type: none"> <li>Refer to <a href="#">section 3.14</a> "Service brake light troubleshooting".</li> </ol>

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"><li>• Engine speed-up does not work (<b>Electronic engine only</b>). See description in <a href="#">section 1.19</a> "Speed-up System Maintenance"</li></ul>	1.The speed-up inhibitor control switch;	1.Check the speed-up inhibitor switch on the console; the speed-up must be set to "Enable".
	2.Speed-up relay(s) inside the console is(are) <u>NOT</u> powered;	2.Refer to <a href="#">section 3.11</a> "Speed-up Troubleshooting".
	3.Faulty wires between the console and the engine's ECM (Engine Control Module).	3.Test for continuity between the speed-up relay(s) and the engine's ECM. Refer to <a href="#">section 3.12</a> "Speed-up harness continuity test".

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The packer does not complete a full cycle.</li> </ul>	1. Body is full, preventing the packer from reaching the fully extended position;	1. Empty the body. Refer to the Operator's Manual <a href="#">section 3.4.9</a> "Breaking the load".
	2. An accumulation of garbage behind the packer prevents the packer from reaching the fully retracted position;	2. Clean behind the packer. Refer to <a href="#">section 1.11</a> "Cleaning the hopper area".
	3. Packer limit switch operation affected by debris or out of adjustment;	3. Clean the area around the limit switches. Refer to <a href="#">section 1.12.2</a> "Limit switch adjustment".
	4. Electrical feed or coil on valve is defective.	4. Refer to <a href="#">section 3.6</a> "Packer control valve troubleshooting".

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The packer does not start at all when pressing "<a href="#">Start Cycle</a>" (green) button.</li> </ul>	1. PTO switch;	1. Make sure the PTO switch is turned "ON".
	2. Emergency Stop buttons (red);	2. Make sure all Emergency Stop buttons (red) are pulled out.
	3. Packer control station not selected;	3. See if the packer control station selector switch is properly set to the one you are using.
	4. Hydraulic;	4. Ensure that the hydraulic pressure is properly adjusted.
	5. Faulty harness between the packer module and the packer control station.	5. Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".
	6. Defective packer module.	6. Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"><li>The packer is moving forward when pressing the <b>GREEN</b> button, but stops when releasing the button.</li></ul>	<ol style="list-style-type: none"><li>Faulty packer module;</li><li>Faulty harness between the packer module and the console.</li></ol>	<ol style="list-style-type: none"><li>Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".</li><li>Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".</li></ol>

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"><li>The packer is moving backwards when pressing the <b>Retract</b> (yellow) button, but stops when releasing the button.</li></ul>	<ol style="list-style-type: none"><li>Faulty packer module;</li><li>Faulty harness between the packer module and the console.</li></ol>	<ol style="list-style-type: none"><li>Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".</li><li>Refer to <a href="#">section 3.8</a> "Packer module troubleshooting".</li></ol>

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"><li>Packer does not perform enough cycles</li></ul>	<ol style="list-style-type: none"><li>Multi-cycle module programming.</li></ol>	<ol style="list-style-type: none"><li>Reprogram the module for higher number of cycles. Refer to <a href="#">section 3.9</a> "Packer multi-cycle module programming".</li></ol>

### 3.3 TROUBLESHOOTING GUIDE (Cont'd)

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>Crusher panel does not go down.</li> </ul>	1. Hydraulic pressure adjustment;  2. Electrical.	1. Make sure the hydraulic system is engaged (PTO switch "ON") and the pressure settings are adjusted. Refer to <a href="#">section 1.15</a> "Hydraulic Vane Pump Systems" or <a href="#">section 1.16</a> "Gear Pump Systems" for pressure adjustment procedure.  2. Refer to <a href="#">section 3.7</a> "Crusher panel troubleshooting."

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
<ul style="list-style-type: none"> <li>The backup alarm and the warning buzzer inside the cab work all the time.</li> </ul>	1. Tailgate limit switch out of adjustment;  2. Body raised limit switch out of adjustment;  3. Limit switch;  4. Faulty harness	1. Adjust the limit switch arm with the tailgate cylinder. Refer to <a href="#">section 1.13.5</a> "Tailgate limit switch".  2. Adjust the limit switch arm with the body floor. Refer to <a href="#">section 1.13.4</a> "Body raised limit switch adjustment".  3. Check the limit switch with a multimeter or VOM for proper operation (ON/OFF or click).  4. Check for continuity on the electrical harness that is connected to the limit switch. Change the electrical harness if necessary.

### 3.4 PUMP TROUBLESHOOTING

The pump is operated using a control switch located on the console. Also, a red warning light indicates when the pump is engaged. Two conditions must be met for the pump to engage and the warning light to turn ON:

1. Air pressure of 90PSI;
2. Engine speed lower than 900RPM.

The 90PSI condition is verified by a pressure switch while the engine speed (900RPM) is verified by the transmission ECU.

If the pump does not engage when the pump (PTO) switch is turned "ON", it may be related to voltage supply problem in the pump circuitry.

The following test will help solving pump related problems but it is also mandatory before troubleshooting any "Auto-neutral" and "Speed-up" system related problem (see [section 3.13](#) "Auto-Neutral troubleshooting", [section 3.11](#) "Speed-up troubleshooting" and [section 3.12](#) "Speed-up troubleshooting on electronic engine").

1. Prior to start testing, ensure that all these conditions are met:
2. Parking brake applied;
3. Engine is running (idle speed);
4. Transmission in "Neutral";
5. All red emergency-stop buttons pulled out;
6. PTO switch "ON";

Refer to the electrical schematic #37979 (Figure #3.6) to follow the numbered test points. A test light or a multimeter (VOM) may be used by connecting the negative probe on the ground post (Single screw in the console on which all the ground wire (#105) are connected to.), and by taking a



FIGURE #3.5

reading with the positive probe at each test point.

**NOTE: IT IS NOT RECOMMENDED TO STRIP OR TO POKE THROUGH THEM TO PERFORM TESTS AS THIS COULD CREATE SHORTS AND/OR WIRE DETERIORATION TEST DIRECTLY IN CONNECTORS AND SWITCHES.**

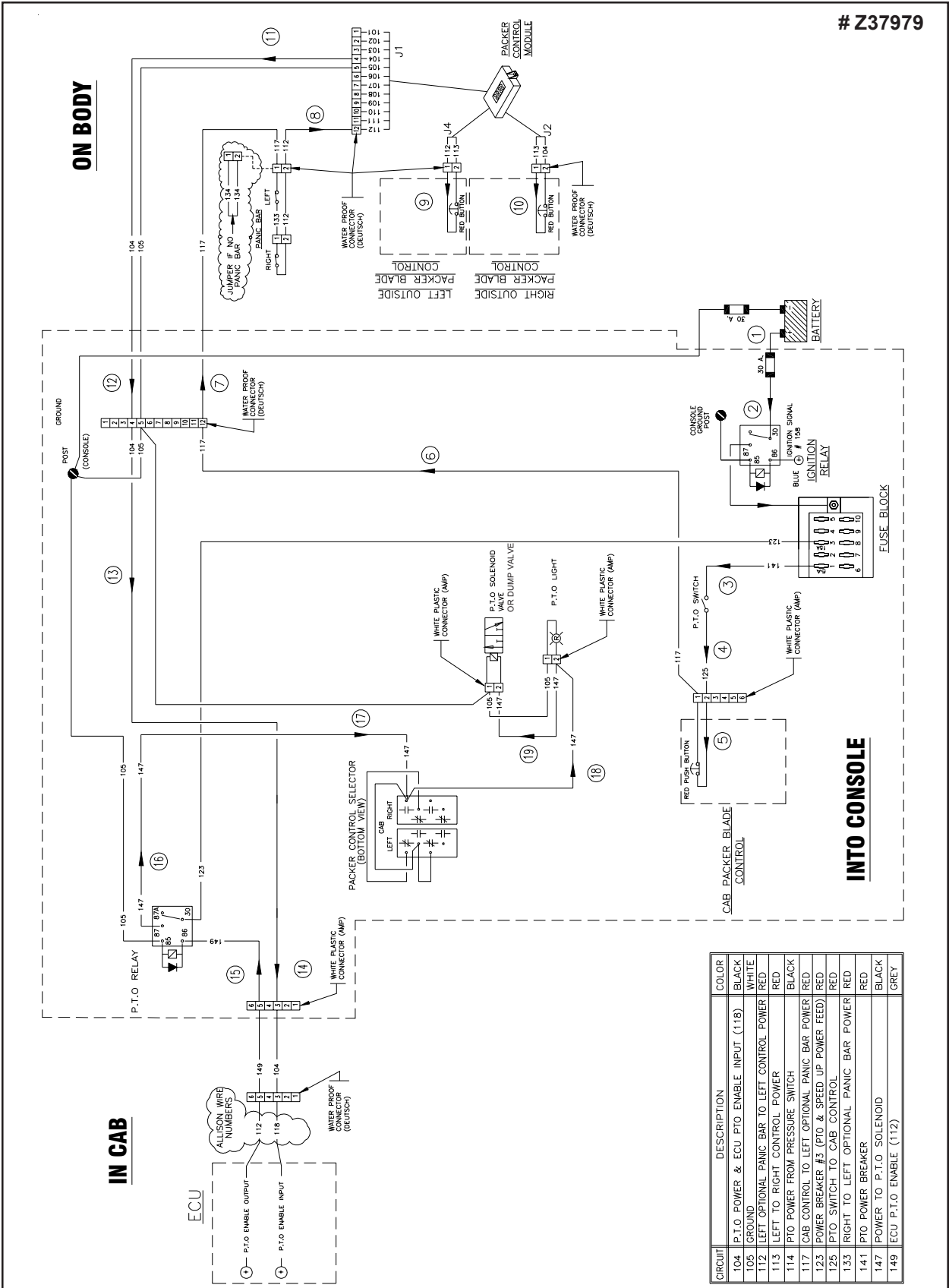
Between steps 14 and 15, the transmission ECU is used as an interlock or safety for the PTO signal (12V input on wire #104). If the engine RPM is higher than 900RPM, the transmission ECU will not allow the output signal (12V output on wire #149) preventing the pump from engaging at high RPM.

The transmission ECU will wait until the throttle drops under 900RPM, allowing the 12-volt output signal on wire #149 (test point 15).

Continue following the path until reaching test point 19. If one of the test points failed, try to pinpoint the source of the shortage between the previous test point and the failing test point.

**NOTE: NEITHER THE ENGINE THROTTLE NOR THE TRANSMISSION NOT BEING IN NEUTRAL WILL AFFECT THE PUMP OPERATION ONCE THE PUMP IS ENGAGED.**





### FIGURE #3.6

### 3.5 PUMP CAVITATION

The cavitation is defined as the formation of air pockets in a moving fluid. The presence of air in the hydraulic oil produces cavitation inside the pump, generating excessive noise. Cavitation is forming most of the time after replacing hydraulic components or after flushing the hydraulic system. Make sure to prime the pump properly after its replacement. Refer to “General Maintenance” [section 1.17](#) “Priming a new pump” in the General Maintenance Manual. When the pump is properly primed, the cavitation will disappear after a short time because air is returning to the hydraulic tank.

If the pump still generates unusual noise after the priming procedure has been, apply the following procedure to remove residual air from the system.

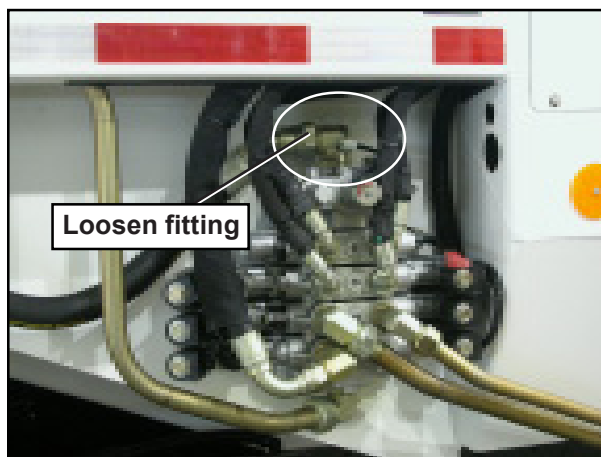


FIGURE #3.7

#### HYDRAULIC SYSTEM BLEEDING PROCEDURE

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Connect a 0-4000PSI gauge to the main valve to ensure that no pressure build-up is present in the system;
3. Apply the parking brake;
4. Start the engine;
5. Engage the hydraulic pump (PTO switch “ON”);
6. Loosen slowly the pressure hose fitting located at the top of the main control valve (Figure #3.7). A mixture of oil and air will come out. Keep bleeding the oil until the pump noise stops. DO NOT ACTIVATE ANY HYDRAULIC FUNCTION DURING SYSTEM BLEEDING;
7. Use a pan or a bucket to collect the oil;
8. Tighten the pipe/hose fitting when the noise has stopped;
9. Cycle the packer to ensure that there is no leaks and the pump is running smoothly;
10. Disconnect the gage.

### 3.6 MAIN VALVE TROUBLESHOOTING

#### 3.6.1 PNEUMATIC-OVER-HYDRAULIC VALVE

##### How it works:

The hydraulic valve which controls some of the vehicle's hydraulic functions is equipped with air actuators (Figure #3.8). The packer air actuator pushes back and forth on the hydraulic spool of the valve, resulting in a movement of the packer (extend or retract).

As the packer reaches the end of a stroke, the limit switches located behind the packer will send the signal to the electronic module telling that the packer has reached the end of its stroke. The packer module will then operate the air solenoid valve inside the console (Figure #3.9) with a 12-volt signal (one signal for packer extend, one signal for packer retract). See also [section 3.7](#) "Packer module troubleshooting".

When receiving the 12-volt signal (extend or retract) from the module, the air solenoid valve inside the console (Figure #3.9) enables the air pressure to reach the actuator on the main control valve. Whether it is the retract or extend signal, the spool will move accordingly.

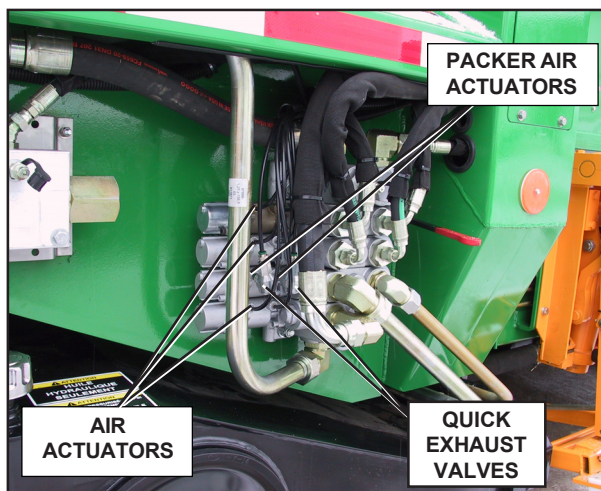


FIGURE #3.8

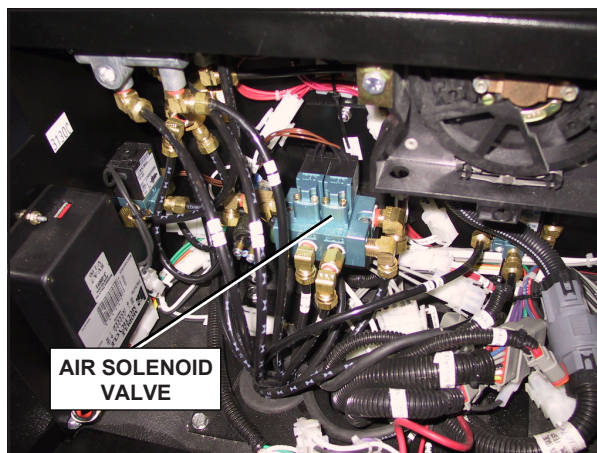


FIGURE #3.9

Four quick exhaust valves — two of which are located close to the body main valve (Figure #3.8) and two under the hoist cylinder (Figure #3.10) — are designed to release the air pressure from lines going to the packer air actuator installed on the main control valve. They release air when the packer reaches the end of a stroke allowing the spool to move in the opposite direction and to prevent working against pressurized lines.

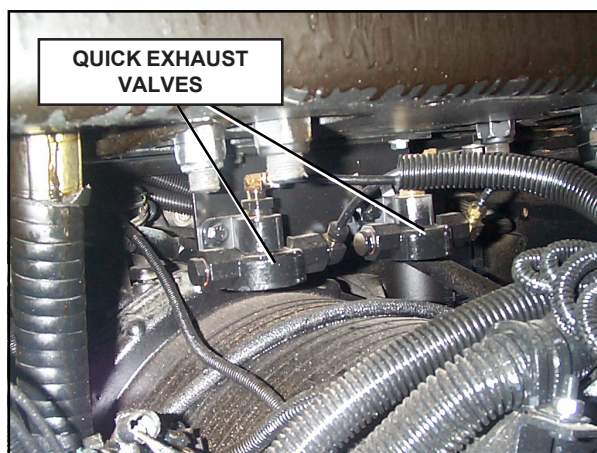


FIGURE #3.10



### 3.6 PNEUMATIC-OVER-HYDRAULIC VALVE TROUBLESHOOTING (CONT'D)

#### Troubleshooting:

If the packer does not complete a full cycle, it may be related to the air system. In order to resolve the problem, apply the following procedure:

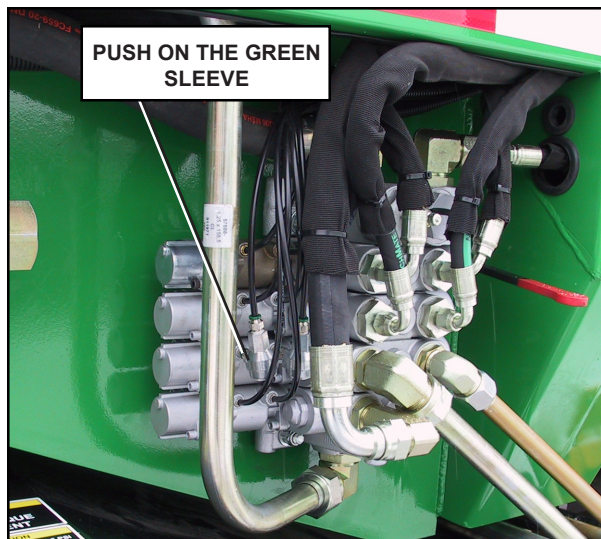


FIGURE #3.11

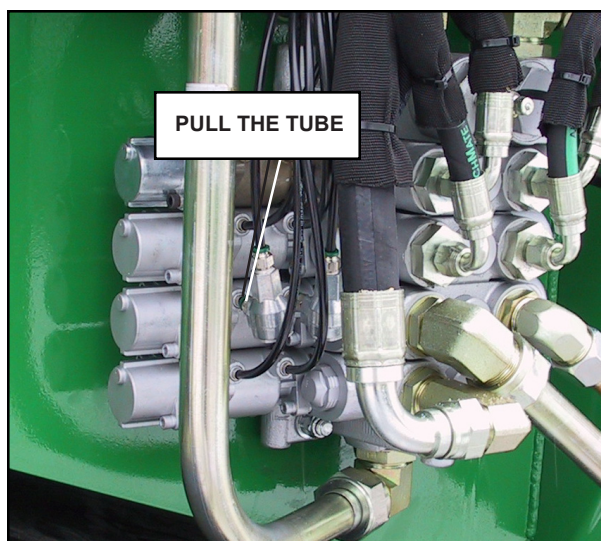


FIGURE #3.12

#### **PACKER AIR SYSTEM TROUBLESHOOTING**

1. Apply all safety measures to ensure safety around the vehicle at all times.
2. Remove the optional cover (if applicable) over the valve to get access to the air tubes.
3. Remove the air tube from the actuator, pushing on the green sleeve with a screwdriver (Figure #3.11). Pull the tube (Figure #3.12).
4. To ensure that the spool moves freely inside the valve, inject pressurized air in one side of the actuator (the same process will have to be done for the other side of the actuator) (Figure #3.13). If the spool is not moving freely, lubricate or replace the air actuator.

**NOTE: IF AIR IS LEAKING BY THE OPPOSITE PORT OF THE PRESSURIZED SIDE OF THE ACTUATOR, WHEN BOTH HOSES ARE REMOVED, THIS COULD INDICATE THAT THE O-RING ON THE PISTON OF THE AIR ACTUATOR IS LEAKING. IF NEEDED DISASSEMBLE CLEAN AND LUBRICATE WITH GREASE OR REPLACE THE O-RING.**

### PACKER AIR SYSTEM TROUBLESHOOTING (CONTINUES)

5. If the spool is moving freely, try injecting air in the tube and see if air is exhausting from the quick exhaust valves underneath the body cylinder and close to the packer valve section actuator.
6. If not, see if air lines are not blocked or bent, then replace the quick exhaust valves if necessary.

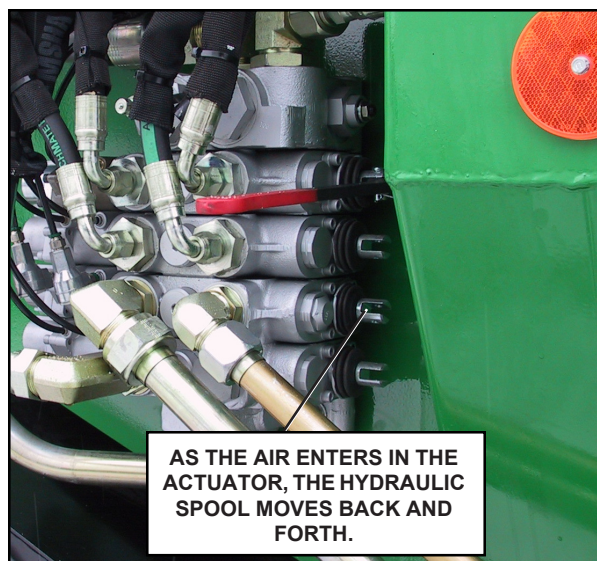


FIGURE #3.14

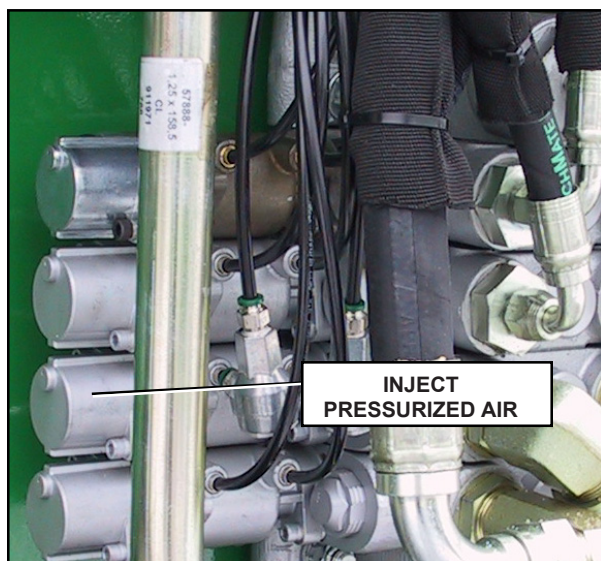


FIGURE #3.13

### 3.6.2 ELECTRIC-OVER-HYDRAULIC VALVE

#### How it works:

The hydraulic valve is equipped with electric coils that activate the spools and therefore, the different hydraulic functions (Figure #3.8).

As the packer reaches the end of a stroke, the limit switches, located behind it, will prompt the electronic module the packer has reached the end of its stroke. The electronic module will then operate the electric coils on the main valve corresponding to the packer functions (12-volt signals, one for packer extend, another for packer retract). See also [section 3.8](#) “Packer module troubleshooting”.

### MAIN HYDRAULIC VALVE

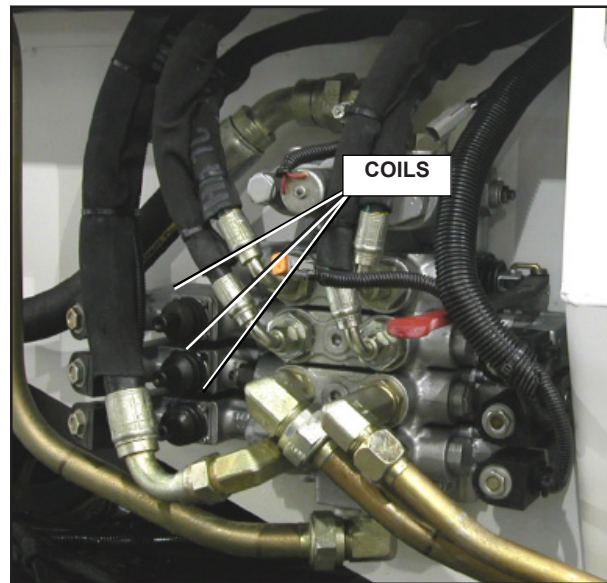


FIGURE #3.8

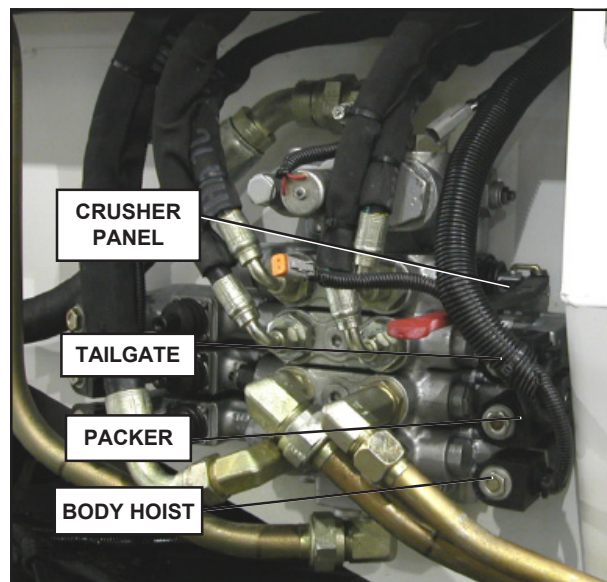


FIGURE #3.9



### PACKER TROUBLESHOOTING

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Identify the packer section on the valve (see Figure #3.11);
3. Verify the hydraulics;
4. In order to verify the hydraulics and the proper valve operation, get a lever from the pouch located in the cab, see Figure #3.10;
5. Install the lever on the packer valve section and move the lever to manually operate the packer. If the packer moves as it usually does, it indicates the problem is not in the hydraulics;
6. Verify the electrical part of the valve;
7. Open the protective loom about 10 inches from the coils on the right side of the valve;
8. From the coil corresponding to the packer valve section, follow the harness to the first connector and get it out of the loom (Figure #3.13).
9. Set up a voltmeter on the male connector and press the yellow button on the controls station. If you read 12 V, take the same measurement on the connector located in the loom of the left side harness of the packer valve section, only this time you press the green button. If you read 12 V on that test point as well, the problem may be found on the coil itself.
10. To verify the state of a coil, set up an ohmmeter on the female connector and take a measurement of resistance. Two scenarios may

### PACKER TROUBLESHOOTING (CONTINUES)

be found:

- zero (0) reading means a short circuit and one (1) means an open circuit;
- both readings indicate the coil is defective. Any other reading would indicate the cause of the problem is elsewhere.

11. Refer to Section 3.8 Packer Module Troubleshooting.



FIGURE #3.10

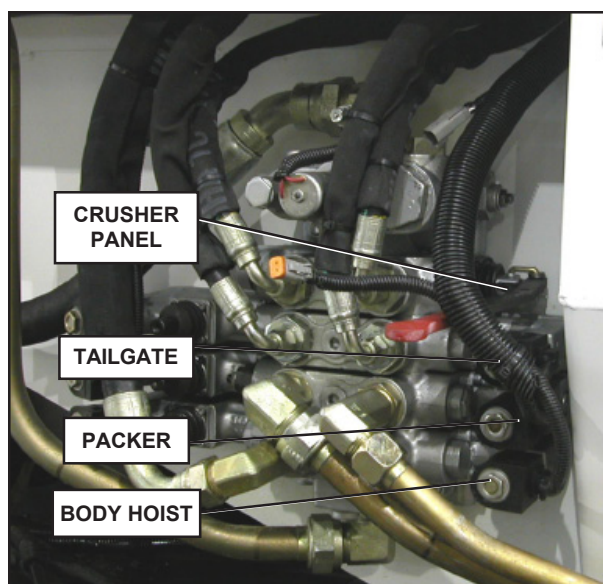


FIGURE #3.11



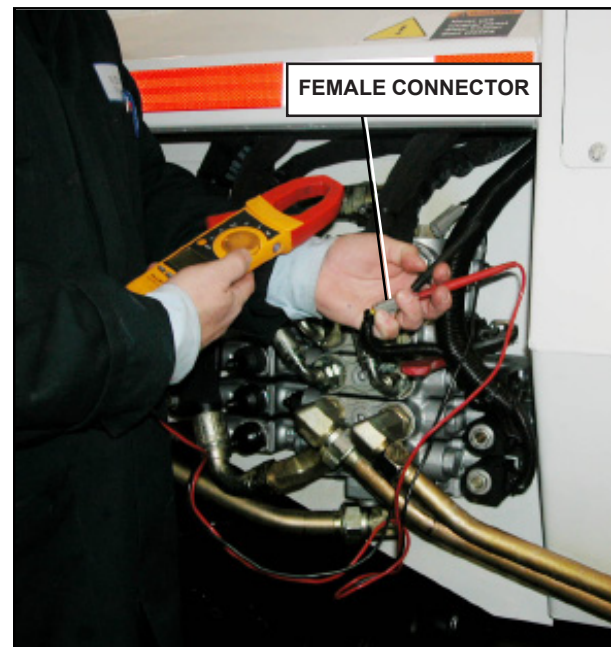
**FIGURE #3.12**



**FIGURE #3.14**



**FIGURE #3.13**



**FIGURE #3.15**



### 3.7 CRUSHER PANEL TROUBLESHOOTING

#### How it works:

The crusher panel is controlled by a manual lever located on the main hydraulic valve (Figure #3.16). The crusher panel is not allowed to move down until the packer is stopped in its fully retracted position. However, it can be raised at any time while packer is moving.

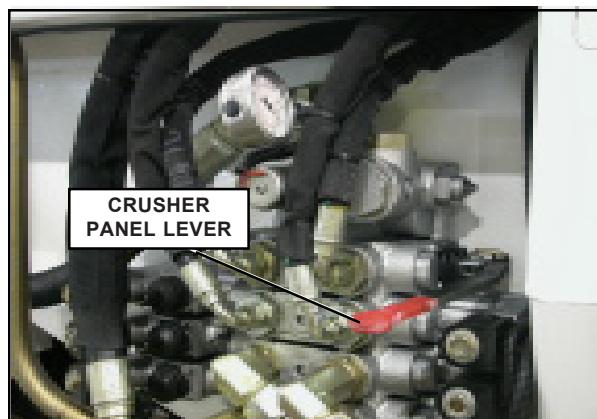


FIGURE #3.16

An interlock system is preventing the crusher panel from lowering when the packer is moving. Garbage caught between the packer and the crusher panel could be blown outside the hopper. Damage could also occur to the top of the packer and the follower panels. When the packer has finished its series of cycles, it returns to its fully retracted position where the R-H side packer limit switch enables the packer module to send a 12-volt signal to the crusher panel lock valve (Figure #3.17).



FIGURE #3.17

This valve, located in the hopper, behind the protective panel above the crusher panel, blocks the oil flow to the crusher

panel cylinder if it does not receive a signal from all limit switches involved in the interlocking system.



#### **WARNING**

**THE CRUSHER PANEL SHOULD NOT MOVE DOWN WHEN THE PACKER IS MOVING.**

To prevent unnecessary procedures, first make sure:

1. the packer is fully retracted;
2. the cart tipper (if equipped) is fully down;
3. the chute (if equipped) is fully tilted to the opposite side from the crusher panel.

**Problem #1**

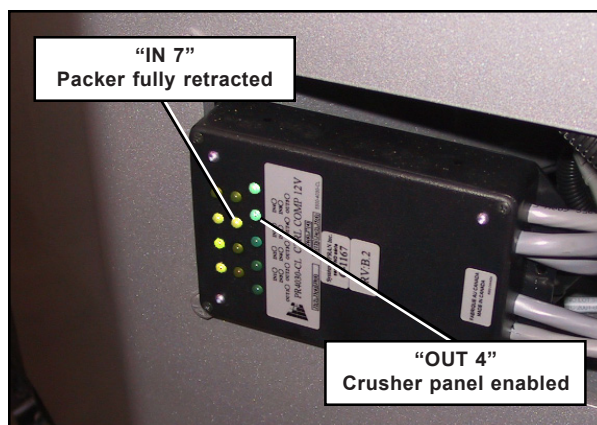
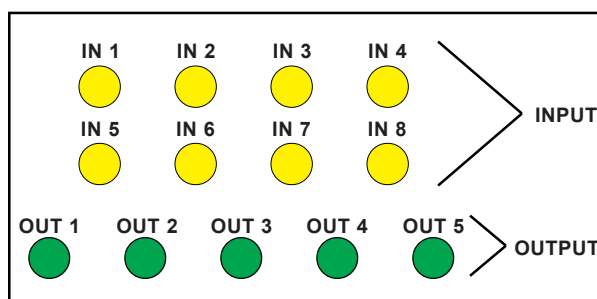
If the crusher panel does not work when the packer is fully retracted, refer to the following troubleshooting procedure:

### CRUSHER PANEL TROUBLESHOOTING

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Start the engine and engage the hydraulic pump;
3. Fully retract the packer;
4. Fully lower the cart tipper (if equipped);
5. Fully tilt the chute (if equipped) to the opposite side from the crusher panel;
6. Open the access panel to the packer module located on the left side of the vehicle (Figure #3.18);
7. See if LED "IN 7" is ON (Figure #3.18). If not, make sure the limit switch on the R-H side of the hopper is properly adjusted. Refer to [section 1.12.2](#) "Limit switch adjustment";
8. When the LED "IN 7" is ON, check for a 12-volt signal on the solenoid valve connector between PIN 1 & PIN 2 (Figure #3.19);
9. If the 12-volt signal is present on wire #108, remove, clean and inspect the valve, replace the solenoid valve if necessary;
10. If no 12-volt signal is found on the connector, check connector "J1" at the packer module and test for 12-volt signal on wire #108, change the harness between the module and the solenoid valve if the 12V signal is found.

**Problem #2**

If the crusher panel seems to be working at all the time when the packer is cycling, the crusher panel lock valve must be faulty or stuck. Replace the lock valve.

**FIGURE #3.18****FIGURE #3.19****PACKER MODULE LED'S LAYOUT****FIGURE #3.20**

Refer to [Figure #3.27](#) for more information on LED's layout of the packer module.

### 3.7 PACKER MODULE TROUBLESHOOTING (Cont'd)

The packer module was designed with a set of LED's to indicate the status of the packer system. These LED's are used to monitor the activity of the packer module during a normal cycle. At any given time, each LED refers to an input or an output.

For example, if the "start cycle" button (green) is pressed, the LED "OUT 3" should turn "ON" and stay "ON" until the packer reaches the end of the stroke (Figure #3.19).



FIGURE #3.19

#### PACKER MODULE LED'S LAYOUT

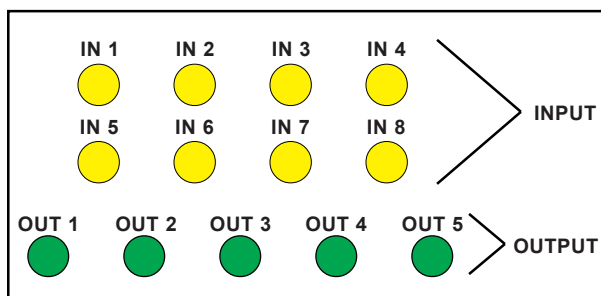


FIGURE #3.20

Refer to figure #3.22 for more information on LED'S layout of the packer module.

If the packer does not start at all or moves forward only when holding the "start cycle" button (green), apply the following procedure to solve problem:

**Note:** This procedure also applies to the "retract" button (yellow).

#### PACKER MODULE TROUBLESHOOTING

1. Apply all safety measures to ensure safety around the vehicle at all times.
2. Ensure that the parking brake is applied and start the engine.
3. Make sure all Emergency Stop Buttons (Red) are pulled out.
4. Remove the access panel on the R-H side of the hopper (Figure #3.17). This will give access to the packer module.
5. Start the engine.
6. Select the proper control station (for multiple packer control stations).
7. Press the "start cycle" button (green) or the "retract" button (yellow) on the packer control station (Left or right) and see if the LED "OUT 3" ("OUT 2" for "retract" button) on the module turns "ON" and stays "ON". If the LED does not stay "ON", REPLACE THE PACKER MODULE.
8. If the LED "OUT 3" ("OUT 2" for "retract" button) stays ON, and the packer does not move, the solenoid valve inside the console might be stuck or defective.



9. Inside the console, press on the override button on the solenoid valve (Figure #3.17). The packer should be moving when manually overriding the valve. If not, make sure that the air lines are not blocked or bent (Also refer to [section 3.6](#) "Packer air system troubleshooting");

10. When either LED "IN 7" or "IN 8" is "ON", check for a 12-volt signal at the valve, coming from the packer module on wire #106 (packer extend) and wire #107 (packer retract). If the signal is present inside the console, remove, clean and inspect the valve, replace the solenoid valve if necessary;

11. However, if the LED on the module is "ON" and no signal is present inside the console, check the continuity of the electrical harnesses between the module and the console. Replace one or both harnesses if necessary.

In order to check the continuity between the packer module and the console, two harness sections require to be tested. The first section of the harness goes from the packer module to the body hinges, where a 12-pin connector can be found (Figure #3.26). The other section goes from the hinge at the rear of the vehicle and returns to the console in the cab.

Unplug the 12-pin connector, and test the continuity on wire #105, #106 and #107 using a multimeter or VOM. Note that a probe extension of 30 feet is necessary and two insulated alligator clips are required to connect the multimeter to both ends of the harness.

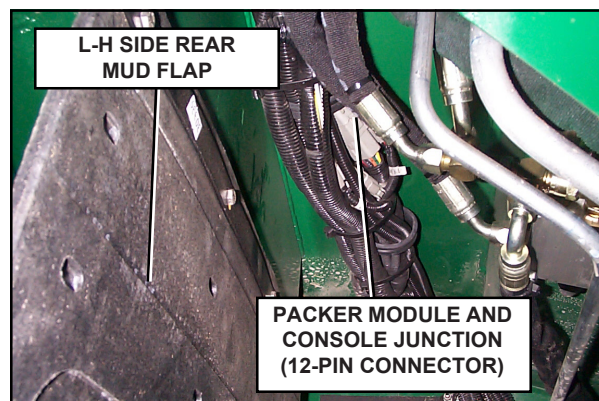


FIGURE #3.21

PACKER MODULE LED LAYOUT	
INPUT LED's	<p>IN 1 : Main power input (Cut by in cab Emergency Stop button)</p> <p>IN 2 : Main power input (Cut by L-H side Emergency Stop button)</p> <p>IN 3 : R-H side packer control station ("ON" when selected)</p> <p>IN 4 : L-H side packer control station ("ON" when selected)</p> <p>IN 5 : R-H side speed-up switch "ON" ("Bunny button")</p> <p>IN 6 : L-H side speed-up switch "ON" ("Bunny button")</p> <p>IN 7 : Packer fully <u>retracted</u> limit switch ("ON" when "clicked")</p> <p>IN 8 : Packer not fully <u>retracted</u> limit switch ("ON" when not "clicked")</p>
OUTPUT LED's	<p>OUT 1 : Acceleration signal "ON"</p> <p>OUT 2 : Packer is retracting or "retract" button (yellow) is "ON" or Packer fully <u>extended</u></p> <p>OUT 3 : Packer is extending or "start cycle" (green) button is "ON"</p> <p>OUT 4 : Multi-cycle output and Crusher panel enabled (Packer fully retracted)</p> <p>OUT 5 : PTO power (Cut by right outside Emergency Stop button)</p>

FIGURE #3.22



### 3.8 PACKER MODULE TROUBLESHOOTING

#### How it works:

Reference: Electrical schematic (Figure #3.33).

When pressing any “start cycle” button (green) on the packer control stations (whether it is in the cab or outside), the packer module will send a 12-volt signal to the packer extend coil on the hydraulic valve (Figure #3.23). At the same time, the built-up solenoid is energized to allow the spool to move.

**NOTE: THE BUILT-UP SOLENOID VALVE ALLOWS HYDRAULIC OIL TO MOVE THE SPOOLS TO AID THE ELECTRIC COIL COMPLETE THAT FUNCTION.**

At the end of the stroke, the limit switch located on the L-H side of the hopper (Figure #3.21) will signal the module to cut the 12-volt signal on wire #107 and to switch the signal (packer retract) on wire #106 (refer to the electrical schematics provided with the truck). The packer will stop and then retract to its initial position, completing a full cycle.

When the packer is returning to its initial position, the limit switch located on the right-hand side of the hopper will cut the 12-volt signal on wire #106 stopping the packer.

**NOTE: FOR INFORMATION REGARDING THE MULTI-CYCLE OPTION, REFER TO SECTION 3.9 “PACKER MULTI-CYCLE PROGRAMMING” AND SECTION 3.10 “PACKER MULTI-CYCLE TROUBLESHOOTING”.**



FIGURE #3.21

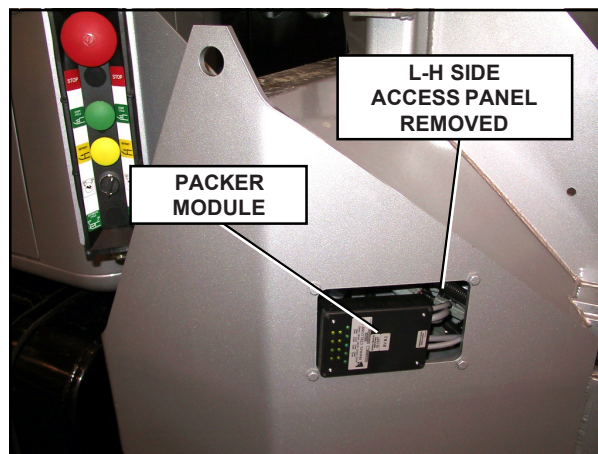


FIGURE #3.22

The packer module is designed with a set of LEDs to indicate the status of the packer system. These LEDs are used to monitor the activity of the packer module during a normal cycle. At any given time, each LED refers to an input or an output.

For example, if the “start cycle” button (green) is pressed, the LED “OUT 3” should turn “ON” and stay “ON” until the packer reaches the end of the stroke (Figure #3.23).

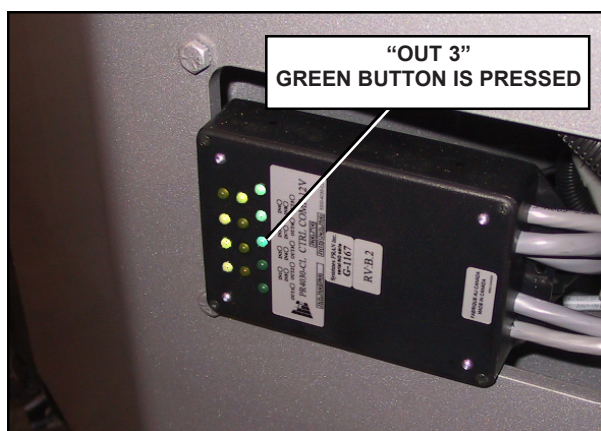


FIGURE #3.23

#### PACKER MODULE LEDS LAYOUT

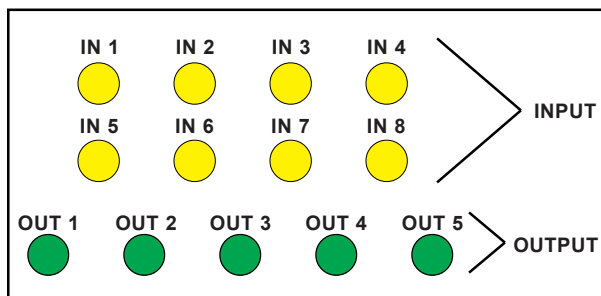


FIGURE #3.24

Refer to figure #3.27 for more information on LED'S layout of the packer module.

If the packer does not start at all or moves forward only when holding the “start cycle button (green), apply the following procedure to solve problem:

**NOTE: THIS PROCEDURE ALSO APPLIES TO THE “RETRACT” BUTTON (YELLOW).**

#### PACKER MODULE TROUBLESHOOTING

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Ensure that the parking brake is applied and start the engine;
3. Make sure all Emergency Stop Buttons (Red) are pulled out;
4. Remove the access panel on the L-H side of the hopper (Figure #3.22). This will give access to the packer module;
5. Start the engine;
6. Select the proper control station (for multiple packer control stations);
7. Press the “start cycle” button (green) or the “retract” button (yellow) on the packer control station (Left or right) and see if the LED “OUT 3” (“OUT 2” for “retract” button) on the module turns “ON” and stays “ON”. If the LED does not stay “ON”, REPLACE THE PACKER MODULE;
8. If the LED “OUT 3” (“OUT 2” for “retract” button) stays ON, and the packer does not move, the hydraulic valve controlling may be stuck or defective (see Section 3.6);

### PACKER MODULE TROUBLESHOOTING

9. When either LED "IN 7" or "IN 8" is "ON", check for a 12-volt signal at the valve, coming from the packer module on wire #106 (packer extend) and wire #107 (packer retract). If you read 12 V, refer to Section 3.6 to inspect the coil;
10. However, if the LED on the module is "ON" and no signal is present inside the console, check the continuity of the electrical harnesses between the module and the hydraulic valve. Replace one or both harnesses if necessary.

In order to check the continuity between the packer module and the console, two harness sections require to be tested. The first section of the harness goes from the

packer module to the body hinges, where a 12-pin connector can be found (Figure #3.26). The other section goes from the hinge at the rear of the vehicle and returns to the console in the cab.

Unplug the 12-pin connector, and test the continuity on wire #105, #106 and #107 using a multimeter or VOM. Note that a probe extension of 30 feet is necessary and two insulated alligator clips are required to connect the multimeter to both ends of the harness.

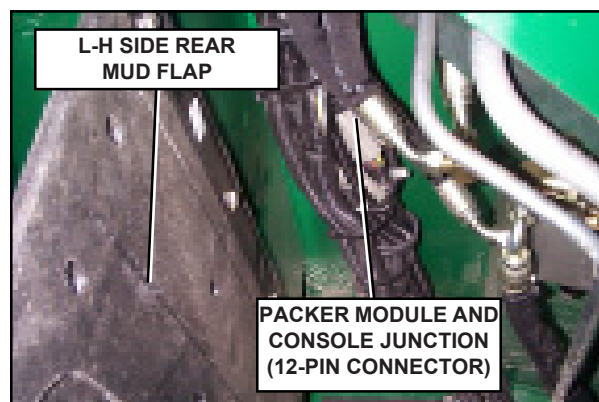


FIGURE #3.25

PACKER MODULE LED LAYOUT	
INPUT LED'S	<b>IN 1</b> : Main power input (Cut by in cab Emergency Stop button) <b>IN 2</b> : Main power input (Cut by L-H side Emergency Stop button) <b>IN 3</b> : R-H side packer control station ("ON" when selected) <b>IN 4</b> : L-H side packer control station ("ON" when selected) <b>IN 5</b> : R-H side speed-up switch "ON" ("Bunny button") <b>IN 6</b> : L-H side speed-up switch "ON" ("Bunny button") <b>IN 7</b> : Packer fully <u>retracted</u> limit switch ("ON" when "clicked") <b>IN 8</b> : Packer not fully <u>retracted</u> limit switch ("ON" when not "clicked")
OUTPUT LED'S	<b>OUT 1</b> : Acceleration signal "ON" <b>OUT 2</b> : Packer is retracting or "retract" button (yellow) is "ON" or Packer fully <u>extended</u> <b>OUT 3</b> : Packer is extending or "start cycle" (green) button is "ON" <b>OUT 4</b> : Multi-cycle output and Crusher panel enabled (Packer fully retracted) <b>OUT 5</b> : PTO power (Cut by right outside Emergency Stop button)

FIGURE #3.27



### 3.9 PACKER MULTI-CYCLE MODULE PROGRAMMING

The multi-cycle module is used to control the number of cycle the packer will do when the “Start Cycle” button (green) is pressed.











The number of cycles needs to be adjusted depending on the type of route the vehicle has to collect. For example, in a residential area, if the houses are numerous and close to one another, it may be required to increase the number of cycle. This will allow the hopper to be clear for the next house pickings.

Located inside the console, the multi-cycle module can be programmed to allow the packer to perform from 2 to 8 cycles. The factory default is 3 cycles. Each time the packer is completing a full cycle, a signal is sent to the packer module by the limit switch located on the R-H side, behind the packer. The module then counts the amount of cycles that the packer does. The module will stop the packer after the preset amount of cycles has been reached.

**NOTE: THE MULTI-CYCLE FEATURE IS OPTIONAL, AND SOME UNIT MAY HAVE DIFFERENT FACTORY SETTINGS.**

In order to increase or to reduce the number of cycle, use the set of DIP switches on the module (Figure #3.29). Refer to the following table (Figure #3.28) to set the module properly. The same table is found on the module (Figure #3.29).

### MULTI-CYCLE PROGRAMMING TABLE

OFF	1	2	3	4	5	6	ON
							











































# of cycle	DIP SWITCH						
	1	2	3	4	5	6	
2							
3							
4							
5							
6							
7							
8							

FIGURE #3.26

### MULTI-CYCLE MODULE

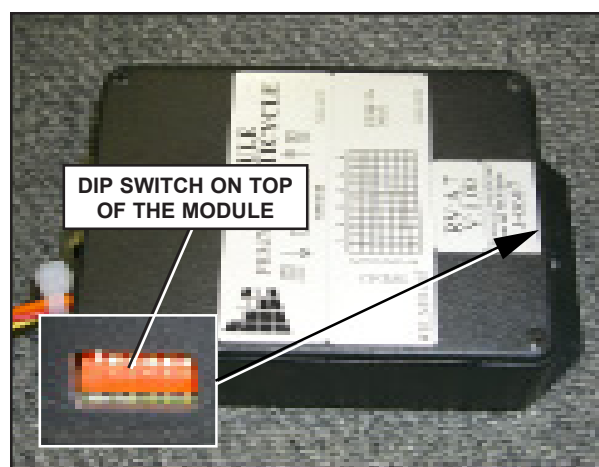




FIGURE #3.27

### 3.10 PACKER MULTI-CYCLE MODULE TROUBLESHOOTING

If the packer no longer performs the multi-cycling (more than one cycle) when the “start cycle” button (green) is pressed, apply the following procedure to verify the system:

#### TROUBLESHOOTING PROCEDURE

1. Make sure the DIP switch setting is within the rectangle setting found on the multi-cycle programming table (Figure #3.28); improper DIP switch setting could keep the packer from cycling;
2.  Make sure the “automatic cycle” button on the console is set to “ON”;
3. Manually retract the packer using the “Retract” button (Yellow); 
4. Lower the crusher panel; if the crusher panel can move, this indicates that the limit switch behind the packer is working properly;
5. Make sure the 3 Amps fuse at the bottom of the module is not blown or loose in the socket (Figure #3.30). If the fuse appears to be loose in the socket, tighten the connector using the proper tool;
6. If the packer is still not functioning with multiple cycles, disconnect the module and using a voltmeter, check all the signals coming from the packer module on the connector;

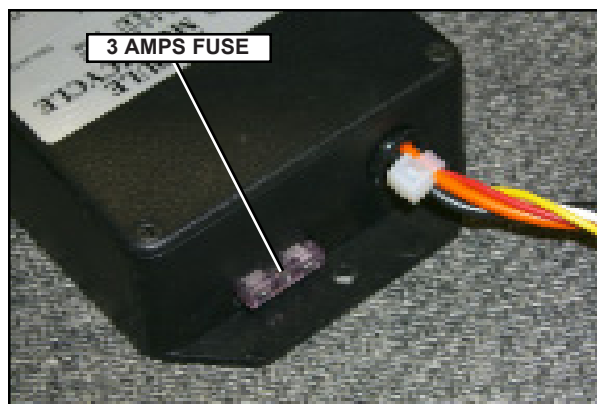


FIGURE #3.28

**NOTE: ALWAYS REFER TO THE ELECTRICAL SCHEMATIC WHILE TROUBLESHOOTING.**

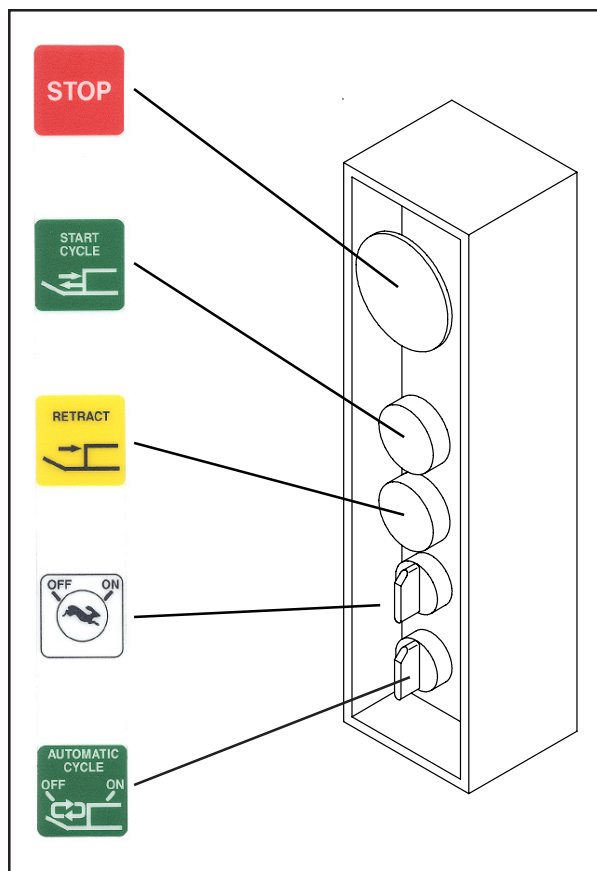


FIGURE #3.29

### 3.10 PACKER MULTI-CYCLE MODULE TROUBLESHOOTING (Cont'd)

The multi-cycle module counts the number of time the packer reaches the fully retracted position. The limit switch sends pulses on wire #106 (retract signal). Until the preset amount of pulses is reached, the multi-cycle module will give an output signal on wire #107 (forward signal) for the packer to perform a complete cycle. This signal has the same effect as pressing on any "start cycle" button (green).

Before starting troubleshooting, make sure that all these conditions are met:

1. Parking brake is applied;
2. Engine is running (at idle speed);
3. Transmission in "Neutral";
4. All emergency stop buttons (red) are pulled out;
5. Pump switch (PTO) turned "ON";
6. There should be 12 volts on wire #147 at test point 1 (figure #3.33);
7. Multi-cycle switch "ON" (Figure #3.31);
8. Packer fully retracted;

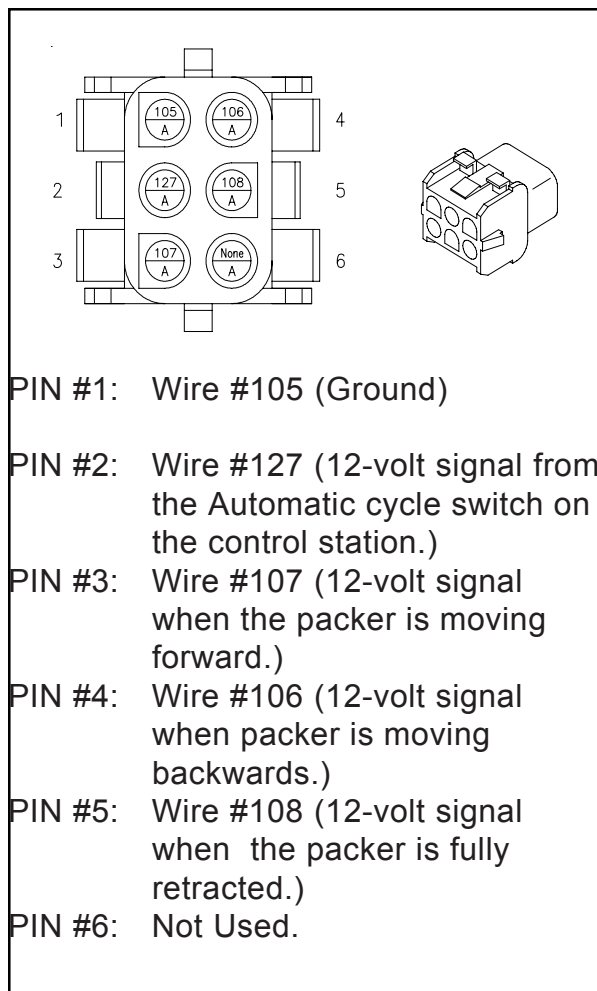
When connecting a voltmeter on terminal 2 (wire #127) of the multi-cycle harness connector, it should read 12 volts. If not, follow the test points 1 through 6 to verify the path of multi-cycle module 12-volt supply.

Test the continuity between terminal 1 of multi-cycle module harness connector and the ground post inside the console; it must have good continuity. If not, check electrical connections.

When connecting a voltmeter on terminal 5 (wire #108) of the multi-cycle harness connector, it should read 12 volts. If not, follow the test points A through E to verify the path of the retracted packer signal.

**NOTE: ALWAYS REFER TO THE MAIN ELECTRICAL SCHEMATIC INSIDE THE CONSOLE**

#### MODULE CONNECTOR LAYOUT



#### MULTI-CYCLE MODULE



**FIGURE #3.30**

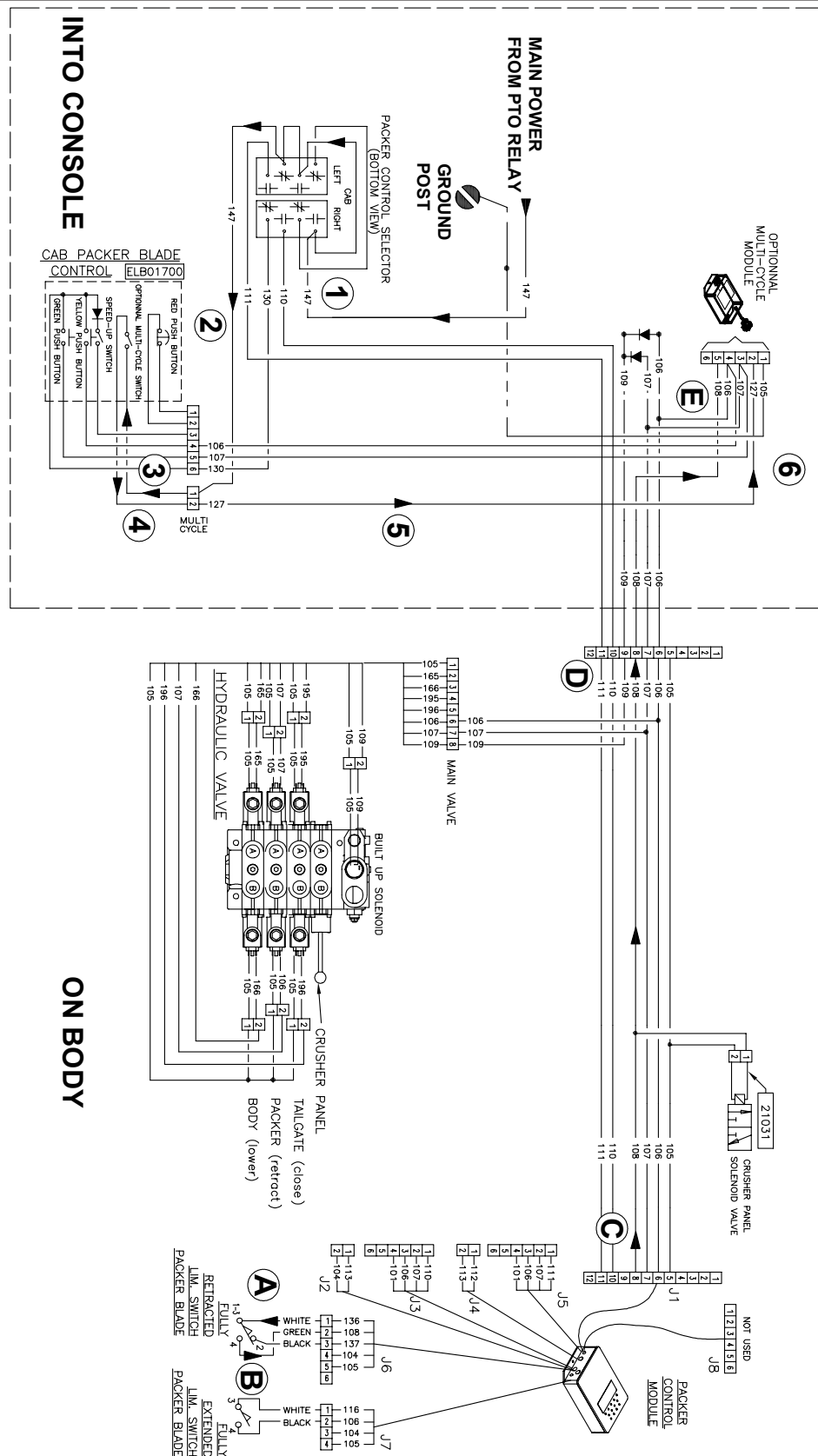


FIGURE #3.33

### 3.11 SPEED-UP TROUBLESHOOTING

The speed-up system will rev up the engine speed to 1500 RPM every time the packer is used or when one of the speed-up switch is activated on one of the packer control stations.

There a master switch called the speed-up inhibitor (Figure #3.32). That will cancel the all speed-up control switch on all packer control stations.

Prior to performing the following troubleshooting procedure, refer to electrical diagram #37977 (Figure #3.33) for test point numbers. This procedure applies to both electronic and mechanical engine.

Make sure that all these conditions are met:

1. Parking brake is applied;
2. Engine is running (at idle speed);
3. Transmission in "Neutral";
4. All emergency red buttons are pulled out;
5. Pump switch (PTO) turned "ON";
6. There should be 12 volts on wire #147 at test point 1 (Figure #3.36).

**NOTE: AN ELECTRONIC MULTIMETER OR VOM IS NECESSARY TO PERFORM THIS TEST (SEE FIGURE #3.1).**

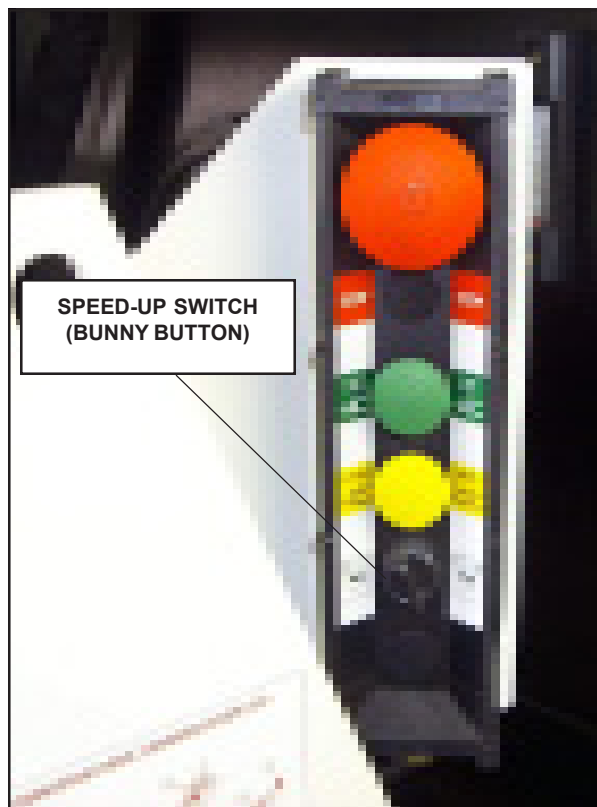


FIGURE #3.31

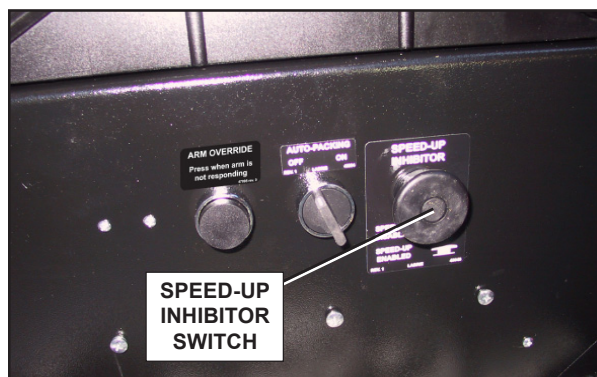


FIGURE #3.32

### **SPEED-UP TROUBLESHOOTING PROCEDURE**

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Select the R-H side packer control station (if more than one packer control station);
3. Set the “speed-up” button to “ON” (Figure #3.34)
4. Using a multimeter or a VOM, check the wire #101 at test point 1. The voltage indicated should be around 12 volts. If not, check the fuse and refer to section 3.4 “Pump troubleshooting”
5. Set the “speed-up inhibitor” switch on the side of the console to “Enable”. Check wire #124 at test point 2. The voltage indicated should be around 12 volts. If not, check the fuse (wire #123) and replace if necessary. If the fuse is fine, the speed-up relay might be faulty. Test with a new relay.
6. Check for a ground signal on wire #153;
7. Connect the multimeter probe between the fuse block and wire #153 at test point 3. The voltage should read around 12 volts;
8. Repeat this procedure for each packer control stations installed on the vehicle;
9. If all the previous tests are fine and still the “speed-up” system is not working, refer to section 3.12 “Speed-up Harness Continuity Test”.

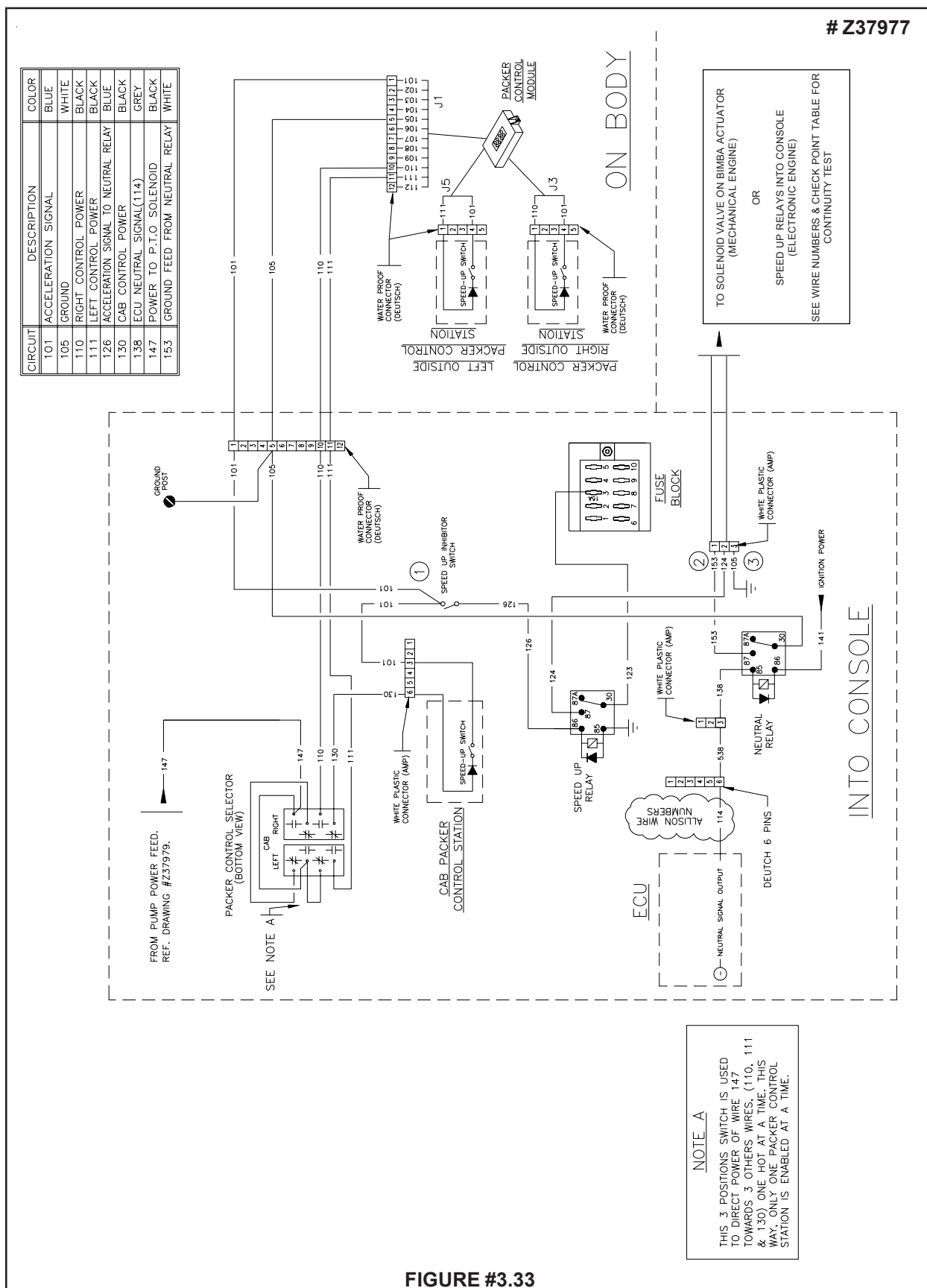


FIGURE #3.33

### 3.12 SPEED-UP HARNESS CONTINUITY TEST

Broken wires or loose connection between the console speed-up relay(s) and the engine ECM module (or the speed-up air cylinder) may cause the engine speed-up not to work properly. A continuity test of this harness is then required.

Also, refer to the “Speed-up relays to engine ECM harness table” (Figure #3.41) to find out the type of relay configuration installed on your particular truck. This table will indicate the proper wire to test between related pins on the relays and the engine ECM connector

**NOTE: AN ELECTRONIC MULTIMETER OR VOM IS REQUIRED TO PERFORM THIS TEST (SEE FIGURE #3.37). ADD AN EXTRA 20 FEET OF CABLE AND TWO INSULATED ALLIGATOR CLIPS TO THE MULTIMETER PROBE TO REACH THE ECM MODULE CONNECTOR UNDER THE HOOD (EXCEPT FOR VOLVO, WHERE THE MODULE IS LOCATED INSIDE THE CAB.**

#### HARNESS CONTINUITY TEST PROCEDURE

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Open the console, locate and identify the relay(s) according to (figure #3.38 or #3.9);
3. Remove the relay(s) from the socket(s) using a small screw driver;
4. Refer to the table on figure #3.41 to identify the wires and the related pins on the relay(s) and the wires on the ECM connector to perform a continuity test;
5. Use a multimeter (VOM) and connect one test probe to the relay socket pin (see speed-up relay table) and the other probe on the ECM module connector. There should be continuity between both ends;
6. If one of the continuity tests fails between the ECM and any of the relay socket pins, check for broken wires or loose connection. Replace the harness between the console and the ECM if necessary.





FIGURE #3.34

### **SPEED-UP 1-RELAY CONFIGURATION (SEE TABLE)**

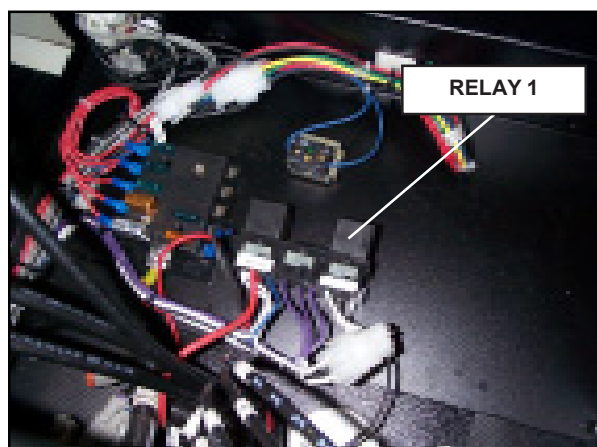


FIGURE #3.35

**NOTE: DEPENDING ON WHICH TYPE OF ENGINE, ONE OR TWO RELAYS MIGHT BE INSTALLED INSIDE THE CONSOLE. SEE FIGURE #3.35 & #3.36 AND REFER TO THE TABLE BELOW TO IDENTIFY THE PROPER RELAY(S) AND THE WIRE NUMBER TO TEST.**

### **SPEED-UP 2-RELAY CONFIGURATION (SEE TABLE)**

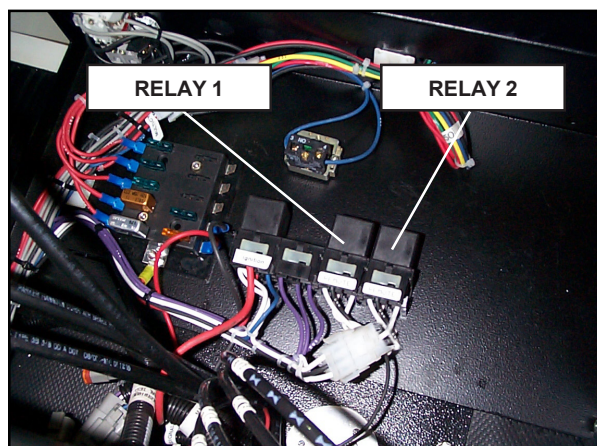
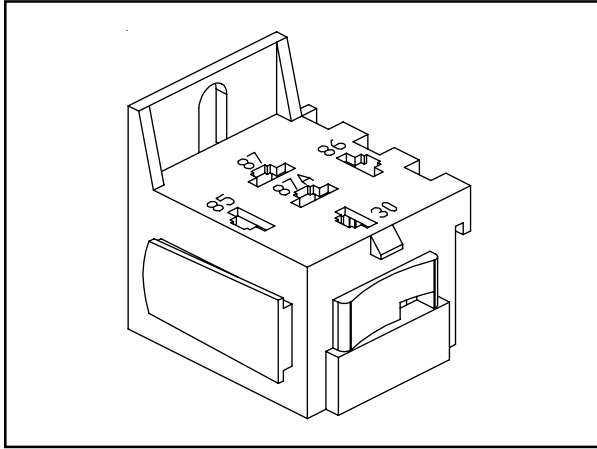


FIGURE #3.36

### RELAY SOCKET LAYOUT AND PIN NUMBERS



**FIGURE #3.37**

### **SPEED-UP RELAY(S) TO ENGINE ECM HARNESS TABLE**

ENGINE TYPE	LOCATION	WIRE NUMBERS AND TEST POINTS				RELAY CONFIGURATION
International Navistar engine	Into console	Wire #557 (black) Set relay pin 30	Wire #558 (red) Set relay pin 87	Wire #559 (green) Enable preset relay pin 30	-	2-Relay See Figure #3.39
	Body builder harness on L-H side of the engine compartment	Wire #46B (grey)	Wire #97CB (purple)	Wire #97DF (purple)	-	
Cummins engine (ISB, ISC)	Into console	Wire #560 (black) Remote PTO relay pin 30	-	-	-	1-Relay See Figure #3.38
	On ECM connectors	Wire #560 pin 46	-	-	-	
Cummins engine (ISM)	Into console	Wire #560 (black) Remote PTO relay pin 30	-	-	-	1-Relay See Figure #3.38
	On ECM connectors	Wire #560 pin 34	-	-	-	
Cummins engine (M11)	Into console	Wire #560 (black) Remote PTO relay pin 30	-	-	-	1-Relay See Figure #3.38
	On ECM connectors	Wire #560 pin 15	-	-	-	
Cummins engine (EPA 2004+) (ISB-ISC-ISL-ISM)	Into console	Wire #4 Remote PTO relay pin 87	Wire #34 Remote PTO relay pin 30	-	-	1-Relay See Figure #3.38
	On ECM connectors	Wire #4 pin 4	Wire #34 pin 34	-	-	
Caterpillar engine w/Labrie cab or Sterling chassis	Into console	Wire #3 Throttle advance relay pin 87	Wire #46 Remote PTO relay pin 30	Wire #56 Throttle advance relay pin 30	Wire #795 Remote PTO relay pin 87	2-Relay See Figure #3.39
	On ECM connectors	Wire #3 pin 3	Wire #46 pin 46	Wire #56 pin 56	Wire #795 pin 5	
Caterpillar engine w/o Labrie cab	Into console	Wire #562 (white) Remote PTO relay pin 30	Wire #561 (Black) Remote PTO relay pin 87	-	-	1-Relay See Figure #3.38
	On ECM connectors	Wire #562 pin 3	Wire #561 pin 56	-	-	
Volvo engine	Into console	Wire #560 Remote PTO relay pin 30	Wire #560 Remote PTO relay pin 30	-	-	1-Relay See Figure #3.38
	On R-H side into cab ECM Module	pin 14 blue connector	pin 29 green connector	-	-	
Mack engine	Into console		Wire #526 (white) Speed-up Mack relay pin 87		-	1-Relay See Figure #3.38
		Wire #526 pin 14 on ECM under driver's seat	Wire V-J2-9-0.8 on PTO switch from Mack	Wire V-J1-6-0.8 speed control switch from Mack	-	

FIGURE #3.38 (A)

**SPEED-UP RELAY(S) TO ENGINE ECM HARNESS TABLE**

ENGINE TYPE	LOCATION	WIRE NUMBERS AND TEST POINTS				RELAY CONFIGURATION
Mechanical engine (all) w/ air actuator (bimba)	Into console	Wire #526 (black) No relay, connector pin 2	Wire #553 (white) No relay, connector pin 1	-	-	-
		Wire #526 on air actuator pin 2	Wire #553 on air actuator pin 1	-	-	

**FIGURE #3.38 (B)**

### 3.13 AUTO-NEUTRAL TROUBLESHOOTING

**NOTE: THIS SECTION APPLIES ONLY TO VEHICLES WITH LABRIE INSTALLED AUTO-NEUTRAL SYSTEM.**

With the auto-neutral switch ON (Figure #3.39), when the service brake on the R-H side driving position is engaged (toggle switch up), the transmission will automatically shift from “Drive” to “Neutral”. When the service brake is disengaged (toggle switch down), the transmission will stay into neutral position until the operator presses the R-H side brake pedal.

#### Electrical principles:

When the service brake is engaged, a pressure switch located behind the service brake panel (Figure #3.38) is sending a 12-volt signal inside the console, energizing the relays (Figure #3.40) which are sending the signal to the Allison transmission ECU to shift from “Drive” to “Neutral” automatically. The neutral light (green) on the R-H side dashboard (Figure #3.41) will turn “ON” as well as the service brake (red).

Because both relays inside the console are

latched by the pressure switch on the footbrake pedal, the transmission will stay into “Neutral” position even after the operator disengaged the service brake.



FIGURE #3.39

#### AUTO NEUTRAL RELAYS 1&2 (INSIDE THE CONSOLE)

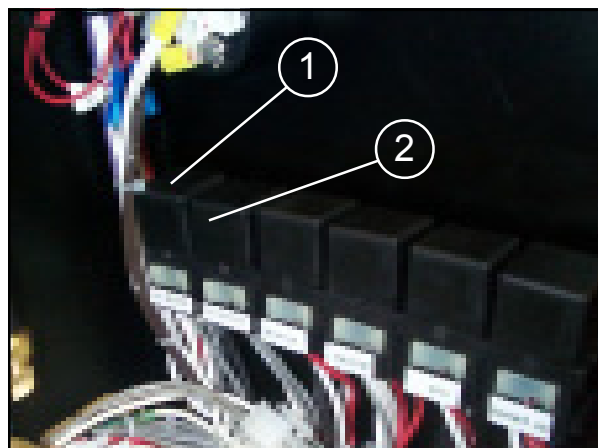


FIGURE #3.40

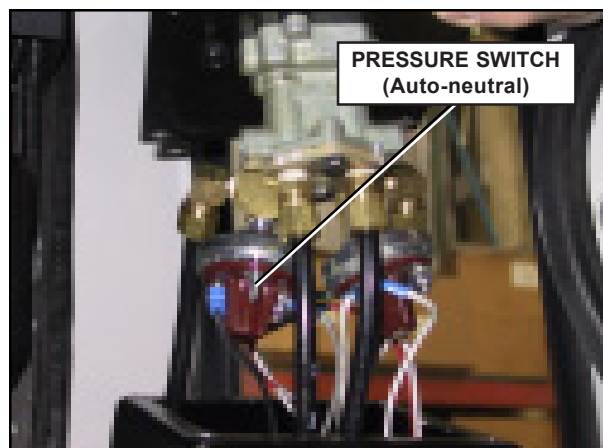


FIGURE #3.38

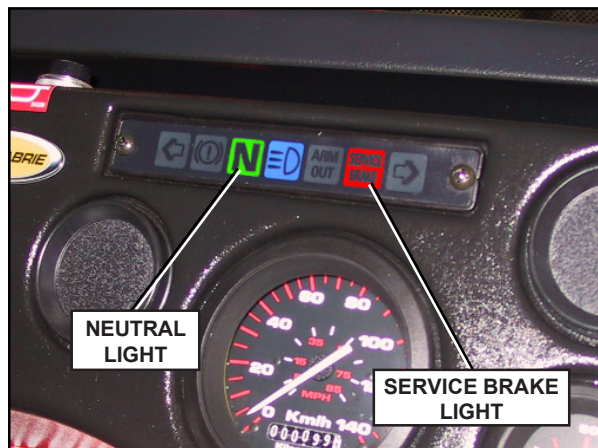


FIGURE #3.41

**NOTE: THE SERVICE BRAKE LIGHT (RED) WILL TURN OFF WHEN THE SERVICE BRAKE IS RELEASED.**

When the operator presses the footbrake, a pressure switch located behind the footbrake pedal assembly (Figures #3.42 & #3.43) will cut the power to the relays and the transmission goes back to "Drive". The neutral light (green) will turn "OFF".

#### PEDAL ASSEMBLY



FIGURE #3.42

#### VIEW FROM BEHIND THE PEDAL ASSEMBLY

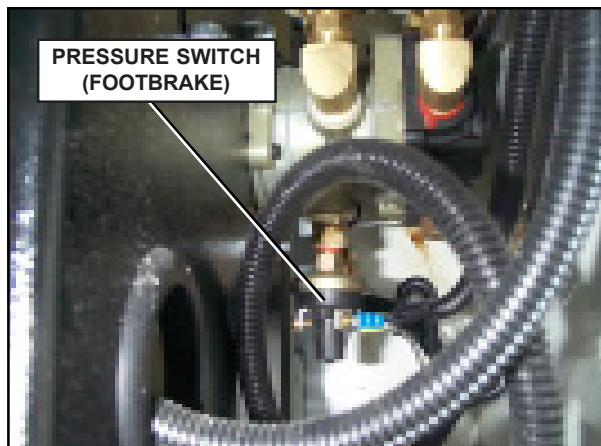


FIGURE #3.43

The Auto-neutral system is using three (3) wires from the Allison transmission ECU. Connected together, these three (3) wires engage or disengage the transmission Auto-neutral (See electrical diagram #37978 for wires #528, #529 & #550).

The wires #529 and #550 are connected to the Auto-neutral switch on the console (See figure #3.48). The relay #1 connects the wire #528 to both #529 & #550 wires, allowing the Allison transmission ECU to perform the Auto-neutral sequence.

The second contact of the Auto-neutral switch supplies voltage to the relays and the Auto-neutral red pilot light on the console.

#### AUTO-NEUTRAL SWITCH (VIEW FROM INSIDE THE CONSOLE)



FIGURE #3.44



### Troubleshooting:

Prior to applying the following troubleshooting procedure, ensure that all these conditions are met:

1. Parking brake is applied;
2. Engine is running (idle speed);
3. Transmission in "Drive";
4. Air pressure above 90PSI
5. Auto-neutral switch "ON";
6. Pump switch(PTO) "ON";
7. All red emergency-stop buttons are pulled out.

#### **TROUBLESHOOTING PROCEDURE**

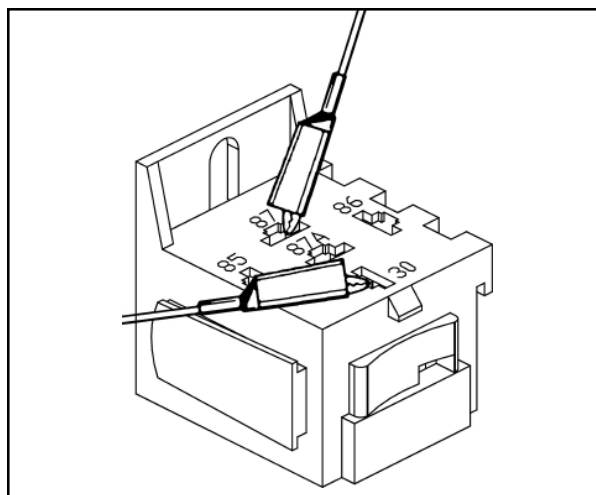
1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Ensure that the service brake is "OFF" (Toggle switch down);
3. Using a multimeter or VOM, check for 12 volts on test points 1 and 2 (See diagram #37978.). If no voltage is present, check fuses and refer to section 3.4 "pump troubleshooting" for proper voltage supply of the Auto-neutral circuit.
4. Check for continuity between both auto-neutral switch poles at test point 9. If test fails, replace the Auto-neutral switch;
5. Apply the service brake (toggle switch up);
6. Once the service brake is applied, check for a 12-volt signal at test point 4-5-6-7-8. If no voltage is found, it could be either a service

#### **TROUBLESHOOTING PROCEDURE (CONTINUES)**

brake pressure switch malfunction or a broken wire between the console and the pressure switch. Refer to Figure #3.40 and perform a continuity test on the pressure switch and the harness. Replace faulty parts if necessary;

7. Remove the auto-neutral relay #1 from its socket, put an alligator clip between the terminal #30 & #87 (Figure #3.44). If the transmission changes from "Drive" to "Neutral" replace the relay.
8. If all the previous tests are fine, and the Auto-neutral is still not working properly, locate the transmission ECU inside the cab and perform the following tests;
9. Perform a continuity test between the Labrie™ wire #550 on the auto-neutral switch and the Allison wire #153 on the ECU module connector;

#### **RELAY SOCKET LAYOUT AND PIN NUMBERS**



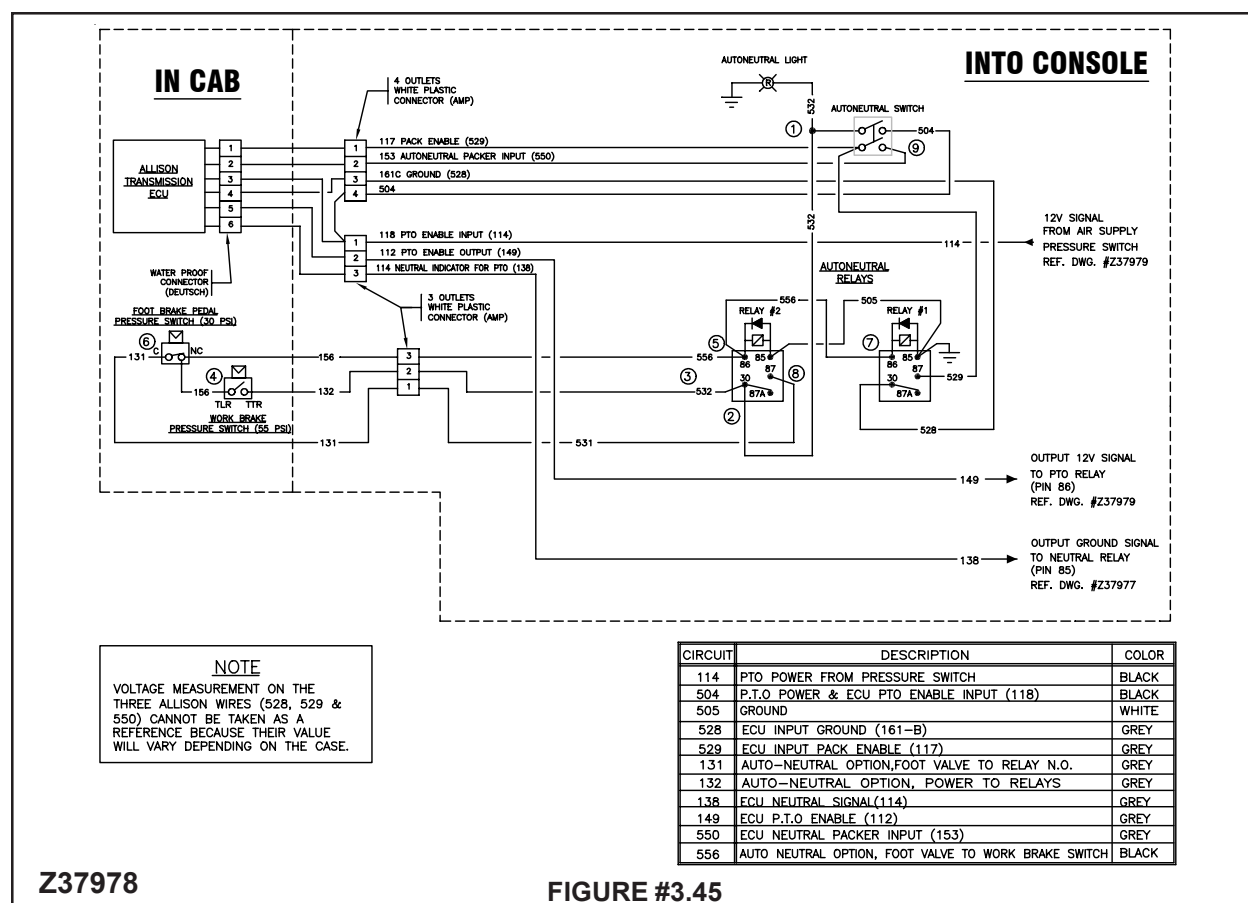
**FIGURE #3.44**

### TROUBLESHOOTING PROCEDURE (CONTINUES)

10. Perform a continuity test between the Labrie™ wire #529 on the relay socket and the Allison wire #117 of the ECU module connector;
11. Perform a continuity test between the Labrie™ wire #528 on the relay socket and the Allison wire #161 on the ECU module connector;
12. If one of the above tests fails, check for broken wires or loose connections. Replace the harness between the console and the ECU if necessary;

### TROUBLESHOOTING PROCEDURE (CONTINUES)

13. The transmission ECU programming may be faulty, preventing the ECU from engaging the Auto-neutral sequence;
14. Refer to section 3.17 "Allison Transmission Programming Parameters" or contact LabriePlus for further details regarding the ECU programming.



Z37978

FIGURE #3.45



### 3.14 SERVICE BRAKE LIGHT TROUBLESHOOTING

**NOTE: THIS SECTION APPLIES ONLY TO VEHICLES WITH LABRIE INSTALLED SERVICE BRAKE SYSTEM.**

If the service brake light (Figure #3.51) is still ON after the toggle switch is lowered, check the toggle switch exhaust holes behind the toggle switch panel (Figure #3.47). The two air exhaust holes might be blocked, preventing the air pressure from releasing.

If the air is exhausting from both holes, the pressure switch that triggers the service brake light may be defective.

Apply the following procedure in order to verify the pressure switch and the electrical wires. This procedure requires the use a multimeter or a VOM and the main electrical diagram of the vehicle located inside the console.

**NOTE: ON SOME UNITS, THE SERVICE BRAKE LIGHT AND THE NEUTRAL LIGHT ARE LOCATED DIRECTLY ON THE TOGGLE SWITCH BOX.**

#### TROUBLESHOOTING PROCEDURE

1. Apply the lockout/tagout procedure;
2. Remove the toggle switch panel in order to reach the pressure switch (Figure #3.52);
3. Disconnect the wires from the pressure switch;
4. Perform a continuity test between each terminal and the casing of the pressure switch. If any continuity is found, replace the pressure switch (Part# PNI00600);
5. Connect the multimeter probes to the pressure switch, between the terminals TTR and TLR (See Figure #3.49).
6. Move the toggle switch up in order to change the state of the pressure switch (ON/OFF). The multimeter should indicate continuity when the toggle switch is set to ON. If not, replace the pressure switch (Part# PNI00600);

#### R-H SIDE DASH BOARD

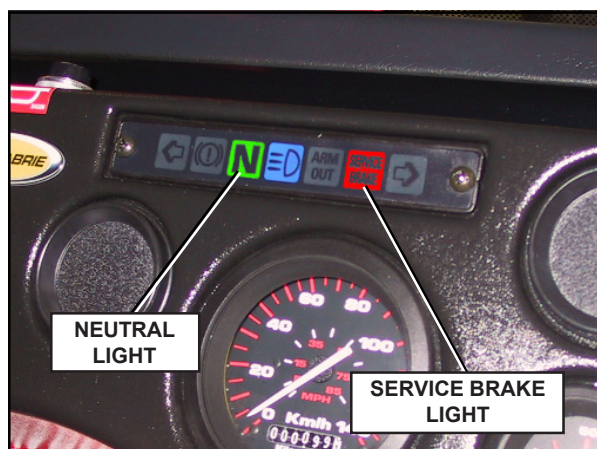


FIGURE #3.46



FIGURE #3.47

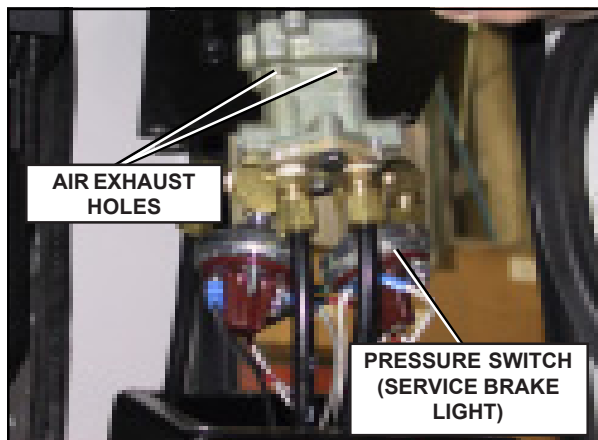


FIGURE #3.48

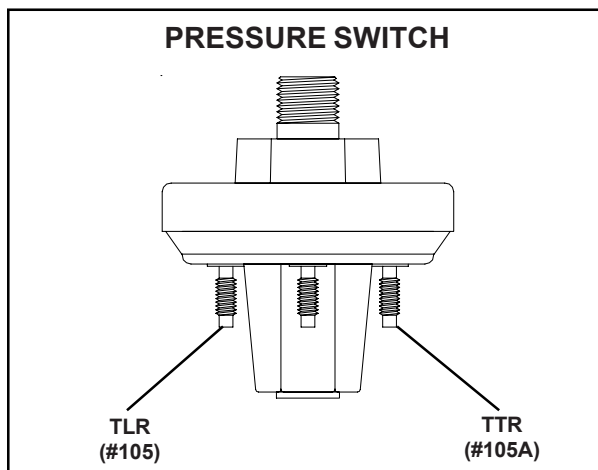


FIGURE #3.49

## TROUBLESHOOTING PROCEDURE (CONTINUES)

7. If the pressure switch state is fine, perform a continuity test between the pressure switch wires and both the console and the dashboard.
8. Check continuity using the multimeter between wire #105 and the ground post inside the console (Refer to the electrical diagram inside the console);
9. Remove the dashboard front panel and locate the main connector and wires #105A (See Figure #3.50);
10. Check continuity using a multimeter between the wire #105A behind the toggle switch and the wire #105A located behind the dashboard;
11. If one or both previous tests fails, change the faulty wires;

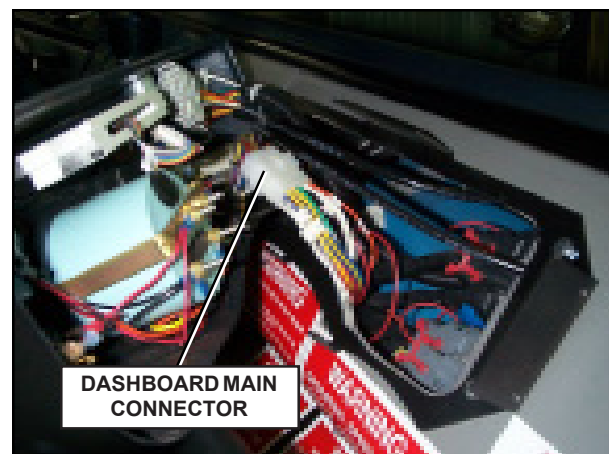


FIGURE #3.50

### 3.15 FOOTBRAKE PEDAL TROUBLESHOOTING

**NOTE: THIS SECTION APPLIES ONLY TO VEHICLES WITH LABRIE INSTALLED AUTO-NEUTRAL SYSTEM.**

The footbrake pressure switch cuts off power to the auto-neutral relay 1 which is ordering the transmission ECU to shift from Neutral to "Drive". If the transmission does not shift in gear when the footbrake is pressed, the problem might be related to a faulty pressure switch located behind the footbrake and accelerator pedals assembly (Figure #3.51 & #3.52).

On the other hand, a faulty harness between the pedal assembly and the console might be involved as well.

A continuity test between the footbrake pressure switch wires and the console relay is required to ensure the reliability of the harness. Apply the following procedure in order to resolve the problem.

This procedure requires the use of a multimeter or a VOM. Refer also to the main electrical diagram of the vehicle located inside the console.

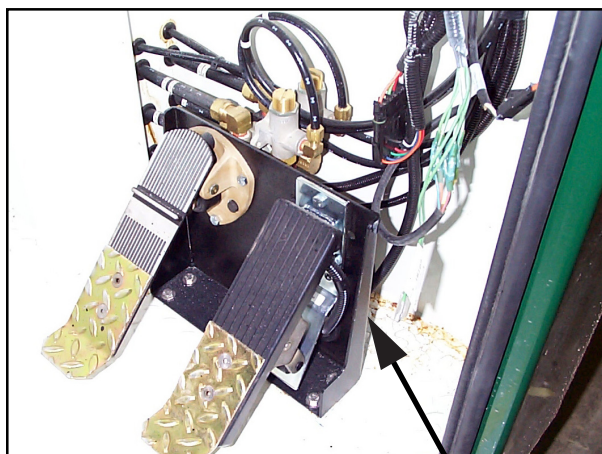


FIGURE #3.51

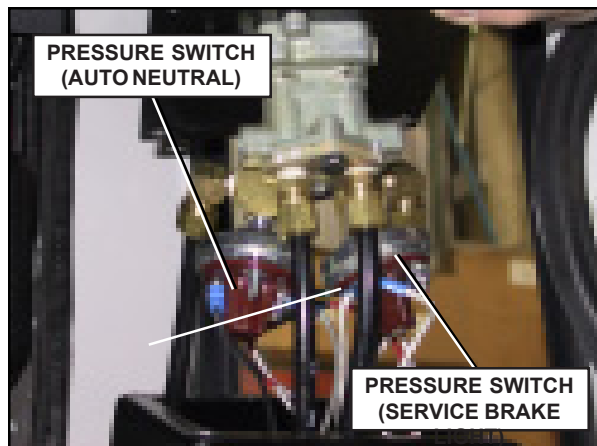


FIGURE #3.53



FIGURE #3.52

### TROUBLESHOOTING PROCEDURE

1. Apply all safety measures to ensure safety around the vehicle;
2. Ensure the parking is applied;
3. Remove the panel behind the brake pedal assembly;
4. It is recommended to unbolt the pedal assembly support from the cab floor in order to reach the pressure switch behind the pedal assembly (Figure #3.52);
5. Disconnect the wires from the pressure switch;
6. Connect the multimeter probes to the pressure switch, between terminals NC and C (See Figure #3.54);
7. Press the footbrake in order to change the state of the pressure switch (ON/OFF). The multimeter should not indicate continuity when the footbrake is applied.
8. Check the continuity between the casing of the toggle switch and all poles of the pressure switch. If one of the previous tests fails, replace the pressure switch (Part #PNI00605).
9. If the continuity test on terminals NC and C of the pressure switch is fine, the harness between the footbrake and the console relays might be faulty;

### PRESSURE SWITCH

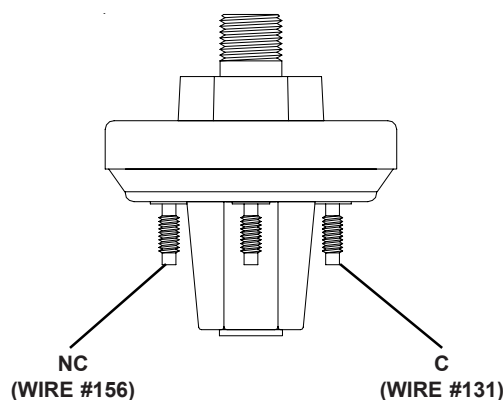





























FIGURE #3.54

### TROUBLESHOOTING PROCEDURE (CONTINUES)

10. Using a multimeter or a VOM, check the continuity between the wire #131 on the pressure switch and wire #531 on the auto-neutral relay #1;
11. Check for continuity between wire #156 on the pressure switch and the wire #556 on the auto-neutral relay #1 & #2;
12. If one or both tests failed, replace the harness (part #23560 for conventional cab) or (part #27731 for cab over).

### 3.16 ELECTRIC SCHEMATICS SYMBOLS

	6 outlets AMP or DEUTCH connector. (Typical)		10 fuses ATO fuse block (ELR00460)
	12-volt single pole N.O.-N.C. relay and base. (ELR00810) and base (ELR00860)		6" 12-volt strobe light (ELL02765)
	12-volt alternating flasher relay. (ELR 00700)		12-volt amber flashing light (ELL02855)
	55 PSI pressure switch N.O. installed on pneumatic line #1. (PNI00600)		12-volt work light (ELL01300)
	0-60 PSI adjustable pressure switch N.O. installed on pneumatic line # 1. (PNI00605)		12-volt backup alarm on chassis (ELA00700)
	12-volt solenoid valve (PNV01957).		Packer module (CL- ELM01005, CF- ELM01025)*
	12-volt dual solenoid valve for packer. (PNV01914)		Multi-cycle module (ELM01605)
	Bipolar switch (ELB02505)		2 N.O. , 2 N.C., 3 positions switch (ELB00260, 2 X ELB00270)
	N.C. limit switch (ELI00550, ELC00200 & ELI00850)		1A diode (ELD00100)
	Single pole switch.		Emergency red button (ELB002200)
	12-volt buzzer on console (ELR01000)	<p>*</p> <p>CL = EXPERT 2000</p> <p>CF = OPTIMIZER</p> <p>N.O. = NORMALLY OPENED</p> <p>N.C. = NORMALLY CLOSED</p>	
	12-volt red pilot light (PNI00500)		
	12-volt green pilot light. (PNI00500 & ELL00300)		
	To ground post into console.		
	12-volt solenoid.	<p><b>NOTE: PART NUMBERS ARE INDICATED WITHIN BRACKETS</b></p>	
	12-volt speed-up air actuator. (PNC00250)		
	10 A fuse (Typical)		

### 3.17 ALLISON TRANSMISSION PROGRAMMING PARAMETERS

The following section shows how the Allison electronic transmissions ECU are programmed for Labrie™ trucks.

If the ECU module of the Allison transmission is replaced, the ECU must be reprogrammed in order to set back the operating parameters of the vehicle. The transmission ECU module programming affects the engine speed, PTO engagement and operation, as well as the Auto-neutral system.

Refer to the following table to reprogram the transmission ECU:

**NOTE: ON CHASSIS SUPPLIED BY LABRIE ENVIRONMENTAL GROUP, THE PROGRAMMING PACKAGE FOR ALLISON TRANSMISSIONS IS #142.**

Some customer's chassis may have different programming packages. Refer to your local Allison dealer for original programming packages. For further information regarding ECU programming, contact LabriePlus.

Parameters shown in this table are applicable on all standard Expert 2000™ and units equipped with a Cool Hand™ or Helping Hand™ automated arm. The table does not apply to Automizer™ units.

<u>ALLISON</u> TRANSMISSION PROGRAMMING PARAMETERS		
PARAMETERS	EXPERT 2000 (Std + Helping Hand)	EXPERT 2000 (Cool Hand)
Maximum engine speed for PTO Engagement:	900 RPM	900 RPM
Maximum engine speed for PTO Operation:	4000 RPM	2300 RPM
Maximum output speed for PTO Engagement:	5000 RPM	5000 RPM
Maximum output speed for PTO operation:	5000 RPM	930 RPM*
Maximum engine speed for Automatic Neutral:	500 RPM* (7 MPH)	200 RPM* (3 MPH)

**The following wires must be activated:**

\* The value is adjusted in order to correspond to the truck's speed in Mph. It may vary according to the differential gear ratios and tire sizes.

**#117:** Pack enable  
**#118:** Input PTO enable  
**#112:** Output PTO enable  
**#153:** Auto-neutral pack enable  
**#114:** Output Neutral indicator - PTO



### 3.18 CYLINDER INTERNAL LEAK DETECTION

An internal leak is caused by a damaged seal inside the hydraulic cylinder (1). Because the cylinder is leaking oil inside (bypassing), a certain amount of pressure is lost reducing the cylinder efficiency and its capacity to push or pull.

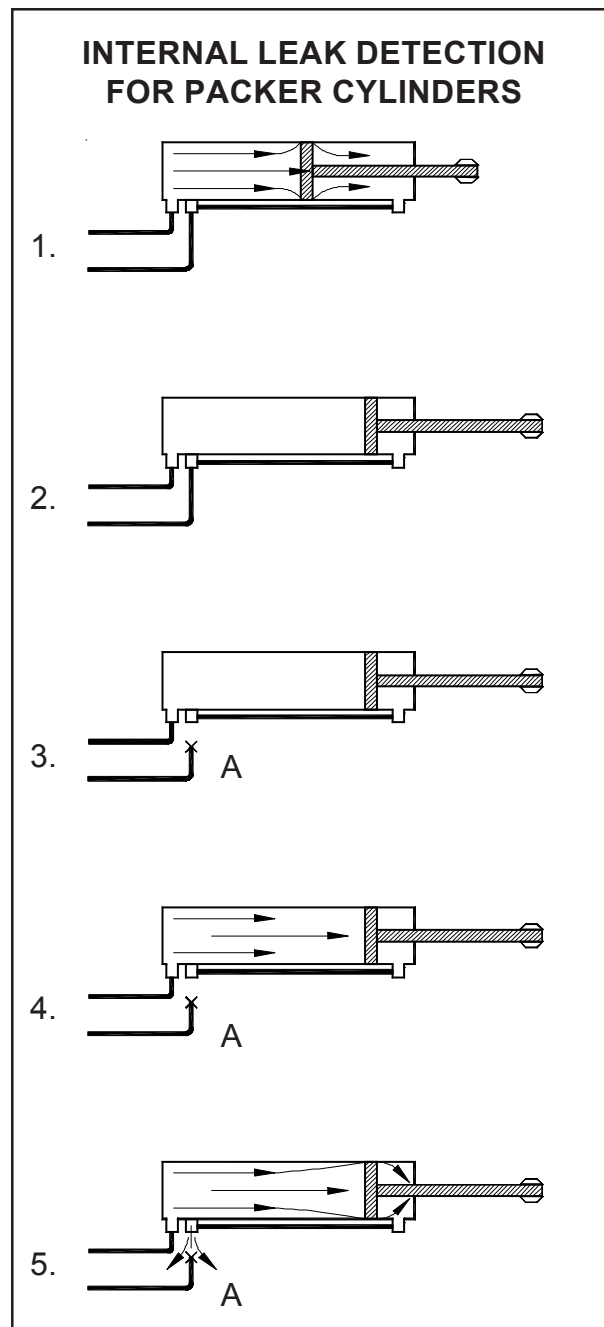


FIGURE #3.61

If the packer cylinders are bypassing, the seal inside the cylinder may require to be replaced. If an internal leak is suspected, apply the following procedure to verify it:

#### INTERNAL LEAK DETECTION FOR PACKER CYLINDERS

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Ensure that the parking brake is applied;
3. Pull out all Emergency Stop Buttons (red);
4. Start the engine and engage the hydraulic pump;
5. Fully extend the packer cylinders;
6. Disengage the hydraulic pump;
7. Disable the fully extend limit switch located on the L-H side, by removing the arm of the limit switch. This will prevent the packer from returning to its initial position;
8. Disconnect hose "A" and install a plug at the end of it;
9. Engage the hydraulic pump;
10. Press the green button and see if oil is leaking from port "A", then press the Emergency Stop Button;
11. If oil leaks out from port "A" when pressure is applied, this could mean there is an internal leak;
12. Replace or repair the cylinder.

### 3.19 TAILGATE LOCKING MECHANISM TROUBLESHOOTING

The tailgate locking mechanism is equipped with hydraulic safety systems that prevent accidental unlocking of the tailgate during operation. One of the systems is the velocity fuse with the “power bleed” and the other is the holding valve.

The spool inside the tailgate section of the valve is designed in such a way, that it will allow pressure to pass through it each time the pressure is building up in the hydraulic system (i.e.: when the packer is working). The pressure “burst” goes to the holding valve into port “D1” and then out to the cylinder by port “U1”. This will keep the tailgate cylinders pressurized and the tailgate closed when packing material.

The velocity fuse, located on the left-hand side of the valve (Figure #3.29), will make sure to drain any slow moving oil coming from the piston side of the tailgate cylinders. Since the rod side is being

pressurized with the “Power bleed” system, the other side has to drain to avoid any pressure build-up. The velocity fuse makes the piston side open to tank when the oil is moving under 3 gallons per minutes and will shut when a flow signal is sent.

**NOTE: REFER TO THE MAIN HYDRAULIC SCHEMATIC (FIGURE #3.65 FOR GEAR PUMP OR #3.66 FOR VANE PUMP).**

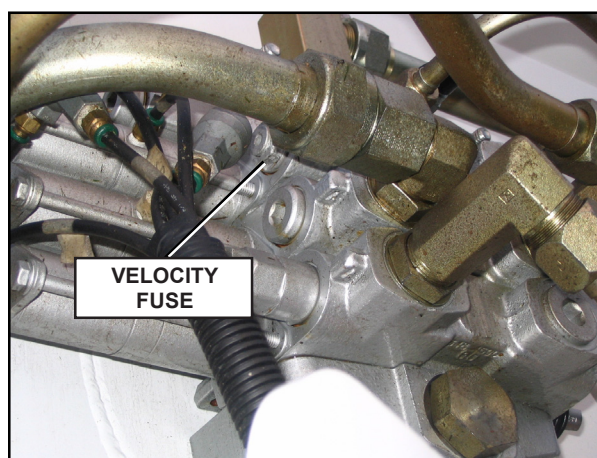


FIGURE #3.62

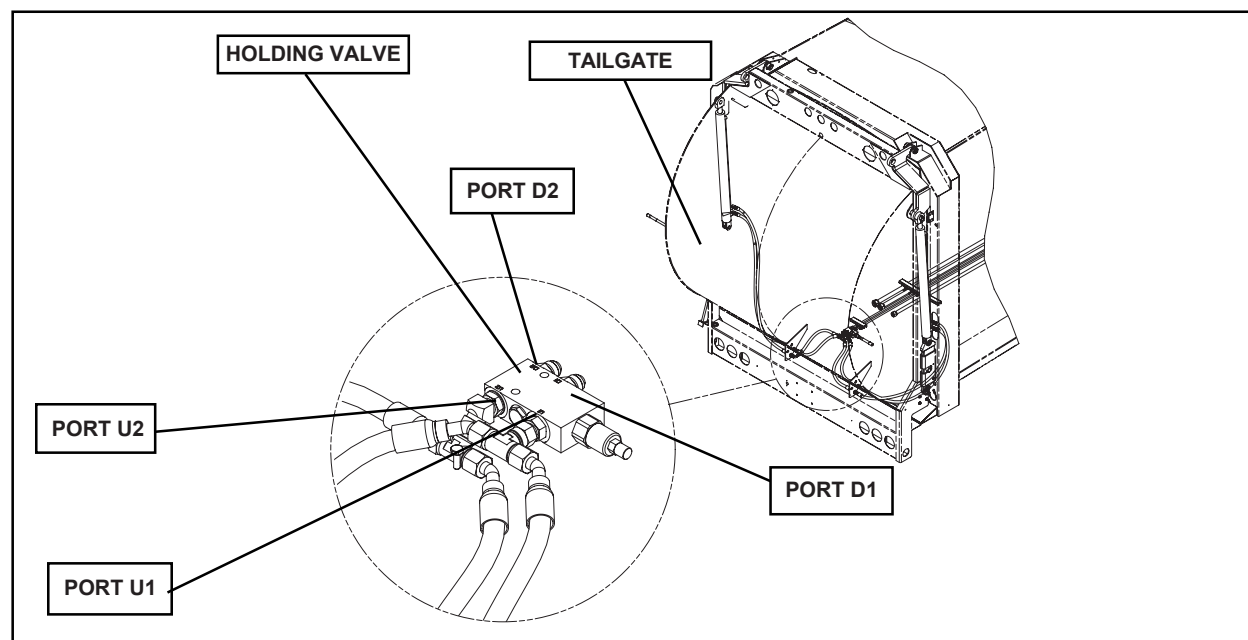


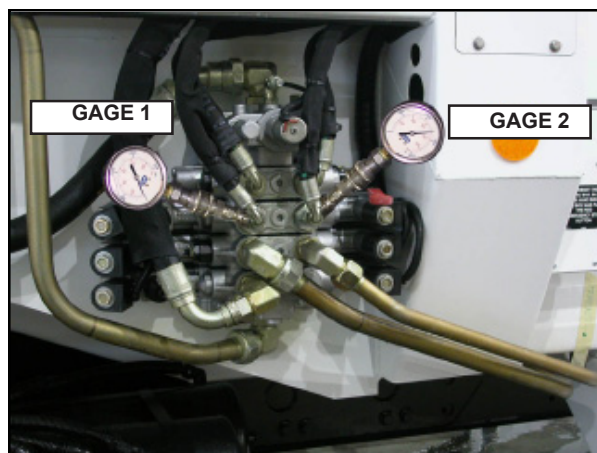
FIGURE #3.63

**Problem #1:****Tailgate is UNLOCKING by itself**

If the tailgate seems to unlock by itself when using the packer, the “power bleed” inside the valve might not work on the right side of the hydraulic cylinder. Apply the following procedure:

**TAILGATE HYDRAULIC  
TROUBLESHOOTING**

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Ensure that the parking brake is applied;
3. Pull out all Emergency Stop Buttons;
4. Install a pressure gage on each port of the tailgate section on the valve, as shown on figure #3.64;
5. Start the engine and engage the hydraulic pump;
6. Press on the “Start cycle” button (green) to start the packer;
7. Gage #1 should always indicate 0PSI and gage #2 should indicate a sudden pressure burst between 0 PSI to 3000 PSI each time the packer reaches the end of a stroke.
8. If gage #1 indicates pressure, this may be caused by a faulty holding valve or hydraulic hoses not properly connected. Refer to the main hydraulic schematic for proper connection.


**FIGURE #3.64**
**Problem #2:****Tailgate is LOWERING by itself**

One other problem that may be found on the tailgate hydraulic system is that it would lower by itself. A faulty velocity fuse might be involved. Apply the procedure below in order to verify and /or replace the velocity fuse.

**TAILGATE HYDRAULIC  
TROUBLESHOOTING**

1. Apply all safety measures to ensure safety around the vehicle at all times;
2. Ensure that the parking brake is applied;
3. Remove the velocity fuse (Figure #3.62) and verify that it is clean and that the plunger is moving freely. A new velocity fuse may be necessary.

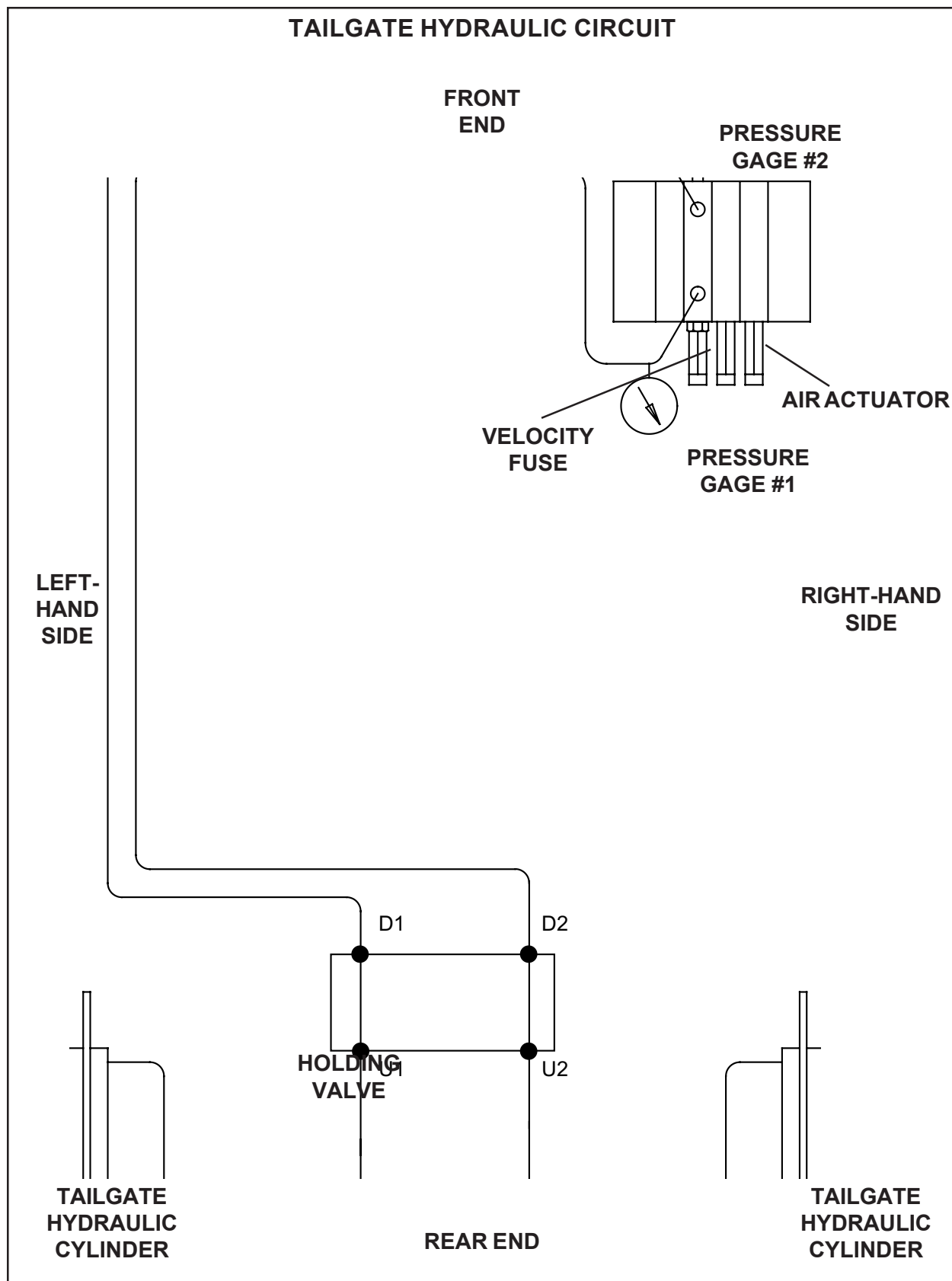


FIGURE #3.65

### 3.20 MAIN HYDRAULIC SCHEMATIC (VANE PUMP)

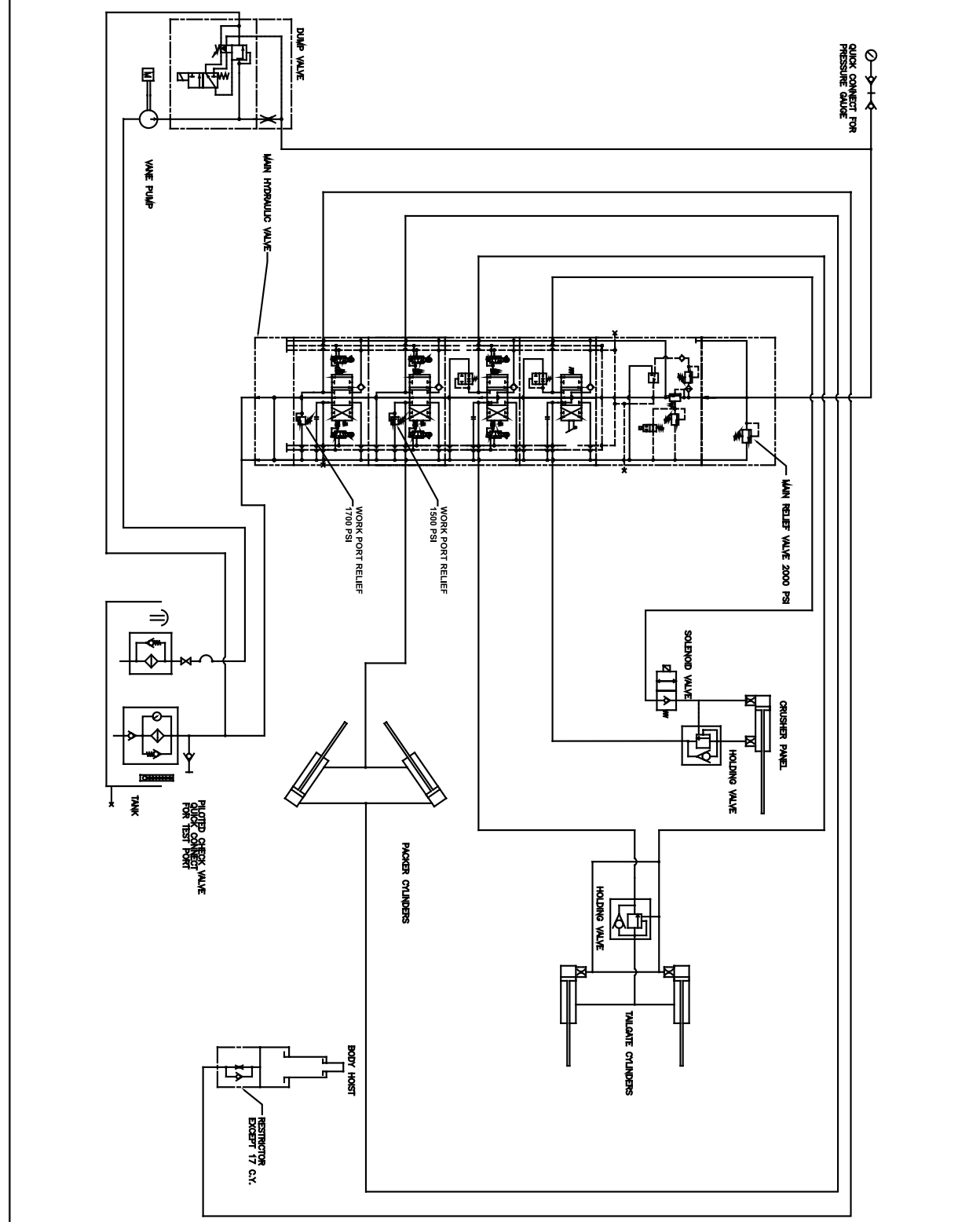


FIGURE #3.67

[illegible]



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